GPCI RESULTS
to
GCSS – DIME – CMAI
WEBSITE

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GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

GPCI group

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and

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GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

GPCI is a working group of the GEWEX Cloud System Study (GCSS)
Models and data are analyzed along a Pacific cross-section
from stratocumulus, to cumulus and to deep convection.

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

GPCI motivation

> To evaluate models and observations in the (sub)tropics in terms of the atmospheric hydrologic cycle.

> To include 3D NWP/Climate models in the GCSS framework (SCM/LES/CRM have limitations).

> To utilize a new generation of satellite datasets (e.g. AIRS, CloudSat, GPS).

> To create a database of models and observations for future studies of the (sub)tropics.

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

GPCI participating models

Model Results		
Organization	***Model***	***Type***
BMRC (Aus)	BAM 4.0.21	Global
CCC (Can)	CCCma	Global
CMC (Can)	GEM	Regional
CSU/BUGS (US)	BUGS	Global
CSU/MMF (US)	MMF	Global/MMF
DWD (Ger)	GME	Global
ECMWF (UK)	ECMWF	Global
ETH / MPI (Ger)	ECHAM5	Global
GFDL (US)	AM2p12b	Global
GKSS (Ger)	CLM	Regional
JAMSTEC (Jap)	AFES2	Global
JMA (Jap)	GSM0412	Global
KNMI (Ned)	RAC	Regional
LMD (Fra)	LMDZ4	Global
MeteoFrance (Fra)	ARPEGE	Global
NASA/GISS (US)	GISS III 3.3	Global
NCAR (US)	CAM 3.0	Global
NCEP (US)	GFS&MOM3	Global Coupled
NCEP (US)	GFS	Global
UCLA (US)	UCLAtm7.3	Global
UCSD (US)	RSM	Regional
UKMO (UK)	HadGAM	Global
UQM (Can)	CRCM	Regional

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

GPCI model data characteristics

Boundary Conditions:
prescribed sea surface temperature.

When?
June-July-August 1998 and 2003.

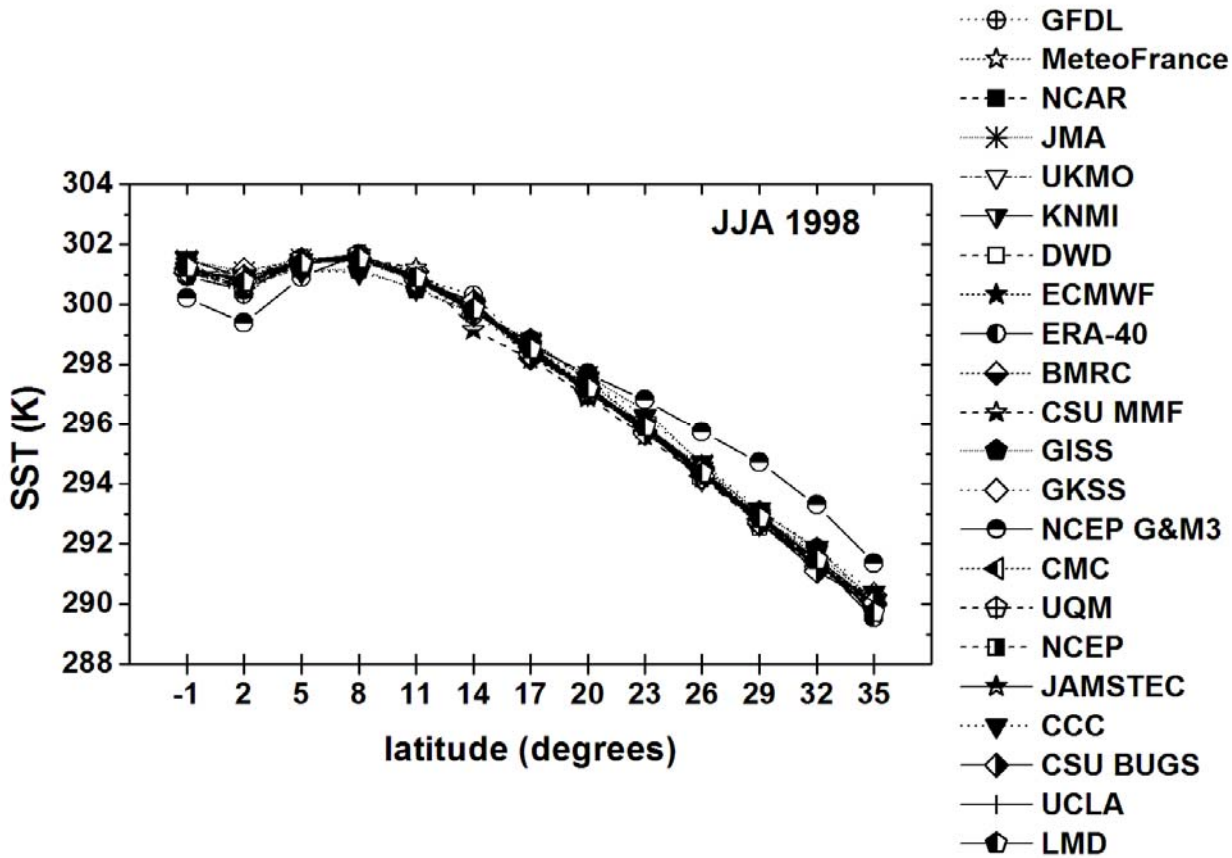
Time resolution:
0, 3, 6, 9, 12, 15, 18, 21 UTC.

Where?
Eastern (Sub)tropical Pacific.

Cross-section:
13 locations starting at 35 N, 125 W and moving southwestwards
at 4 deg longitude and 3 deg latitude steps until 1 S, 173 W.

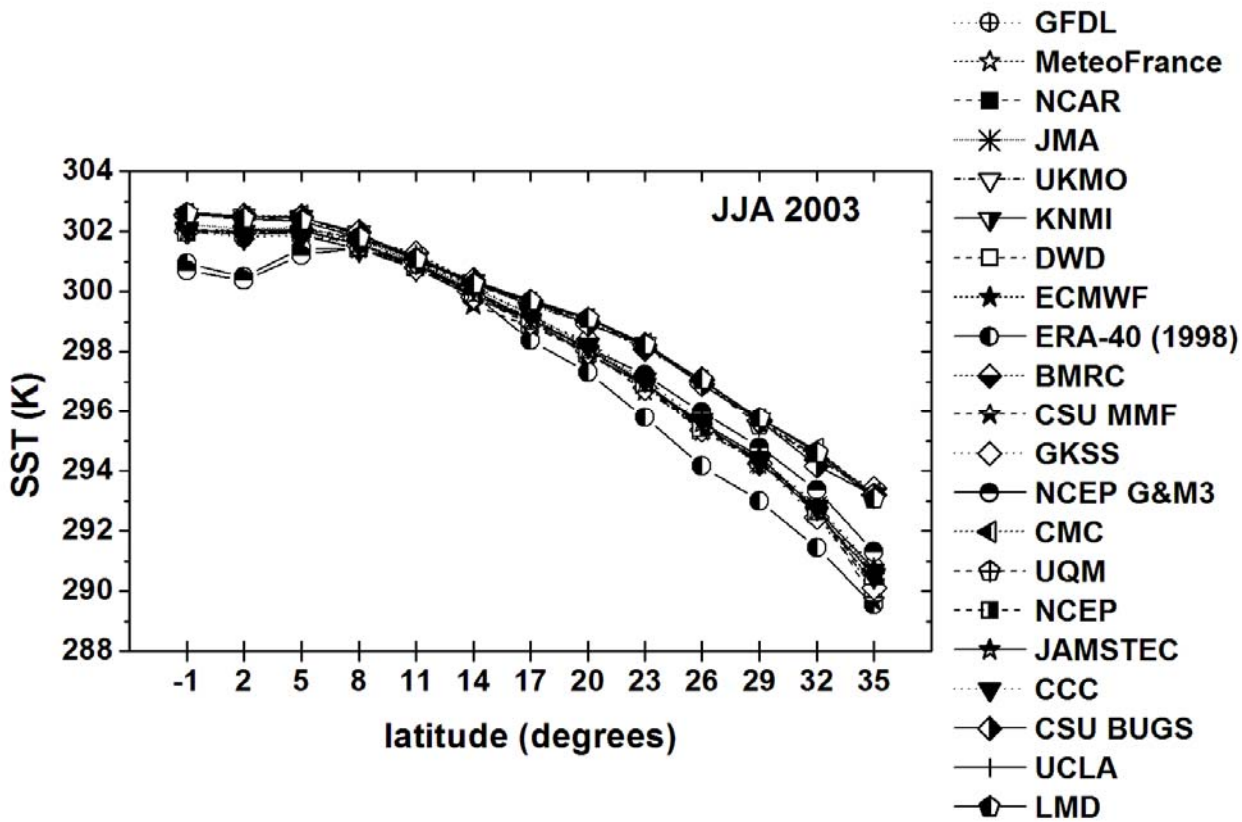
2D map:
locations every 5x5 degrees within the following grid:
latitude from 5 S to 45 N, longitude from 160 E to 120 W.

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)



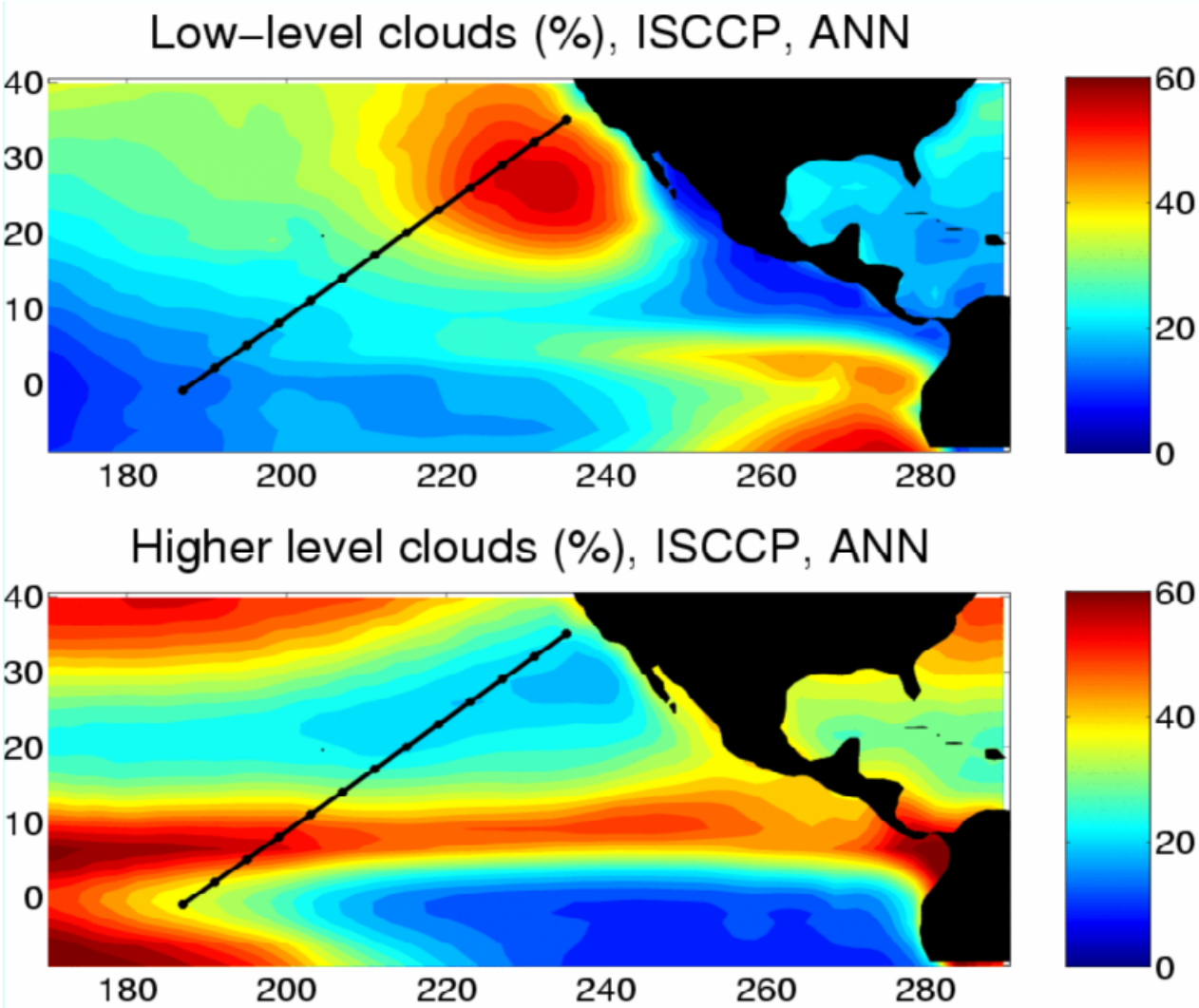
Prescribed SST (1998).

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)



Prescribed SST (2003).

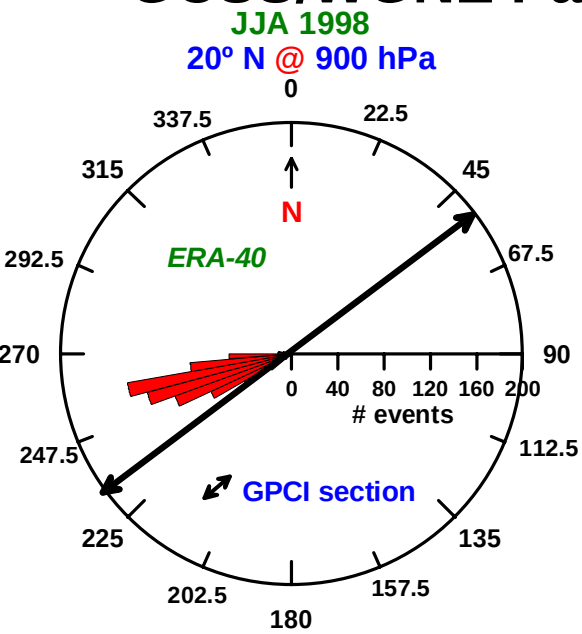
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

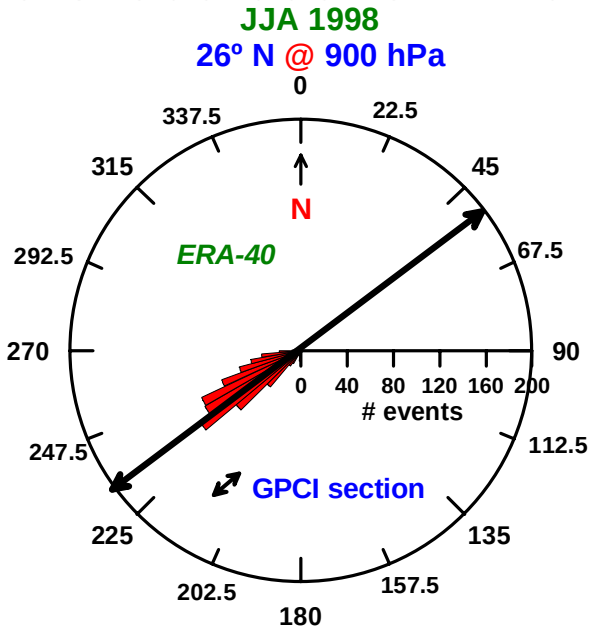


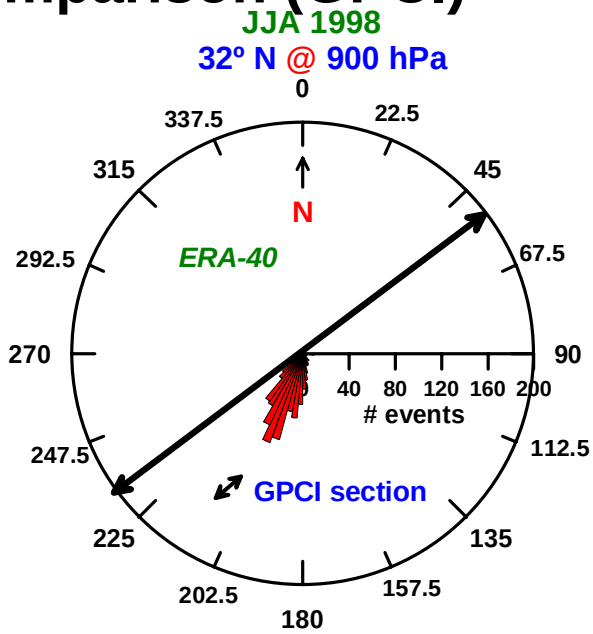
Courtesy Cecile Hannay (NCAR)

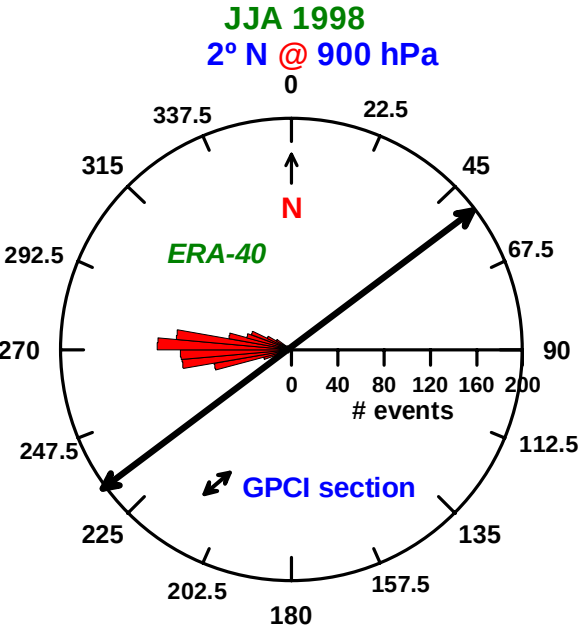
The 13 locations along the cross-section (ISCCP total cloud cover in background).

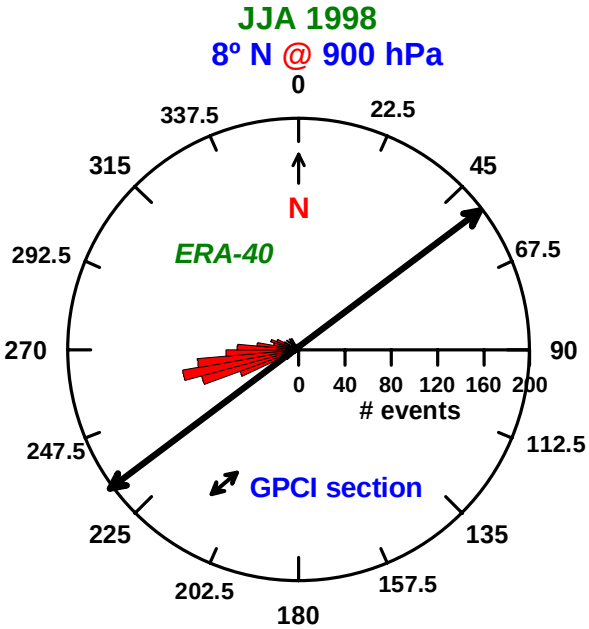
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

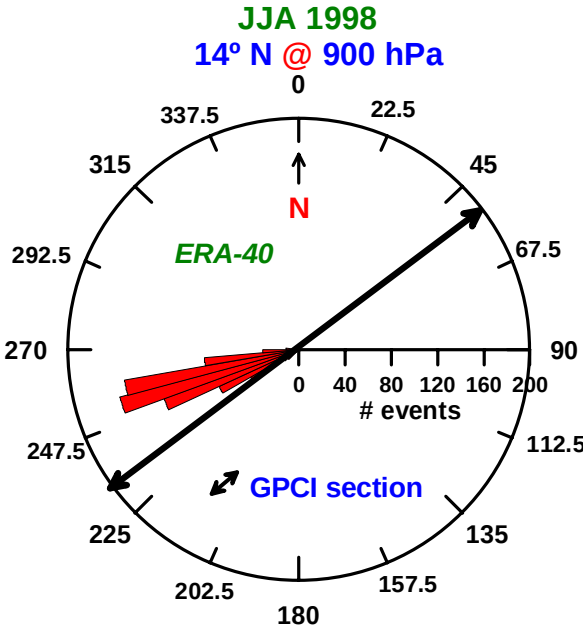






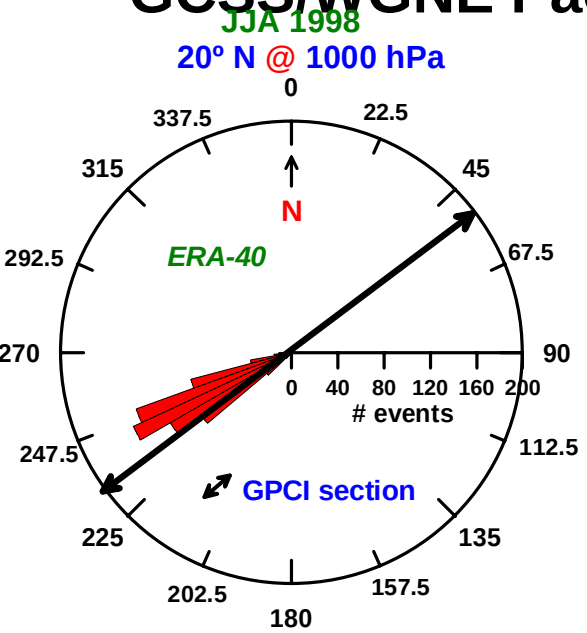


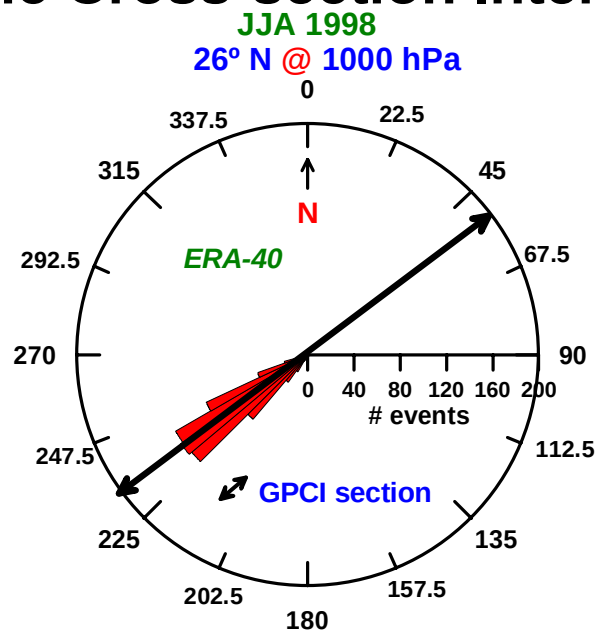


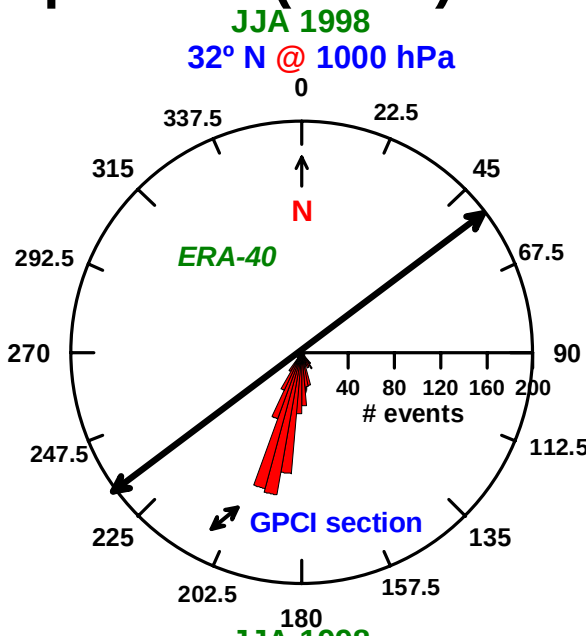


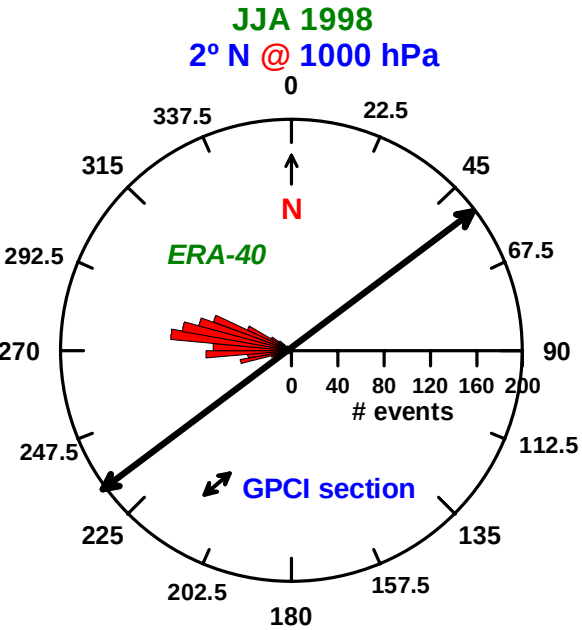
900 hPa PBL winds in the cross-section.

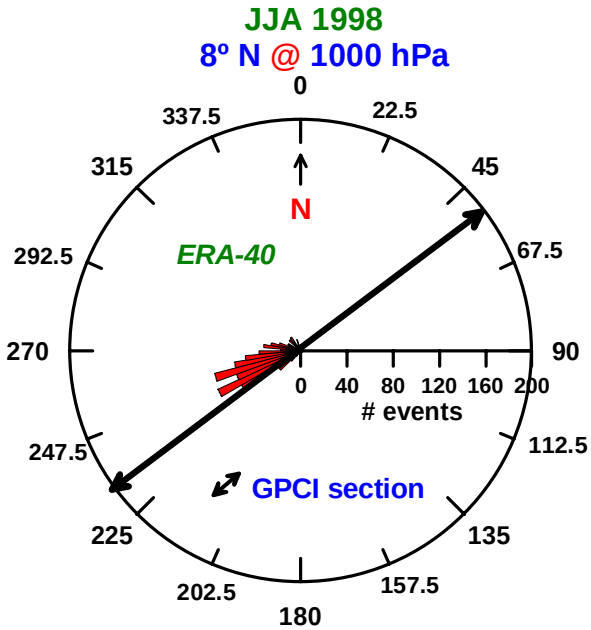
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

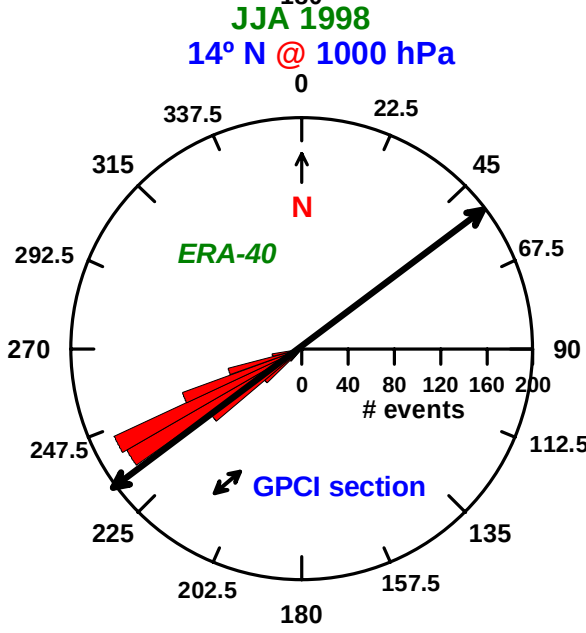








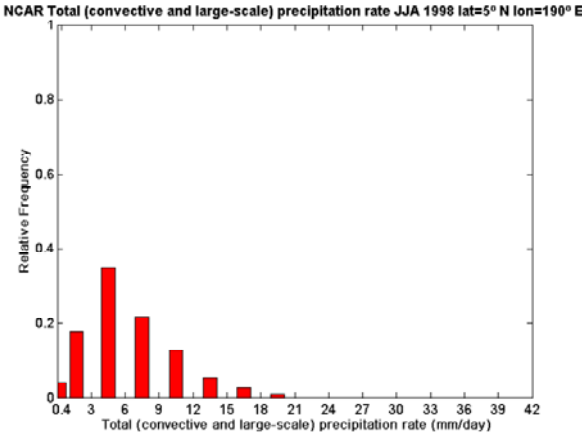
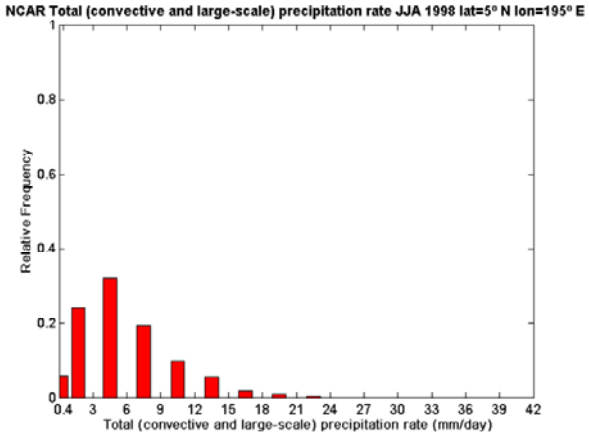
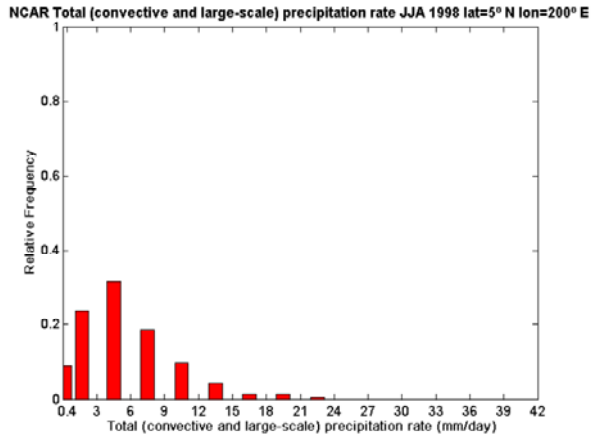
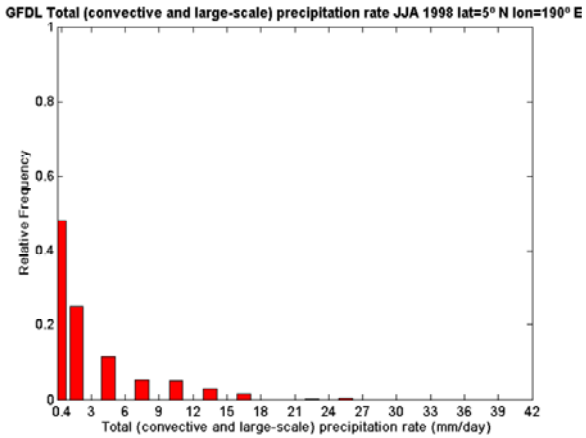
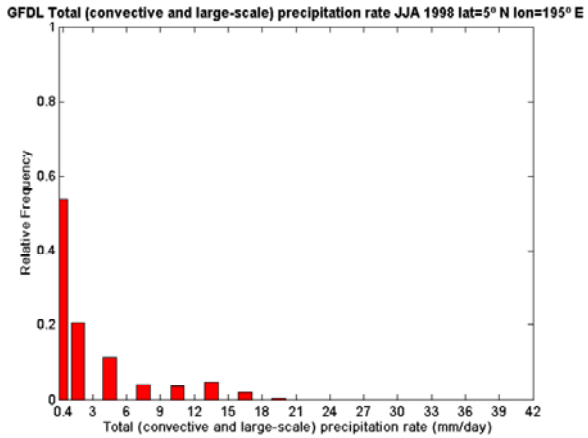
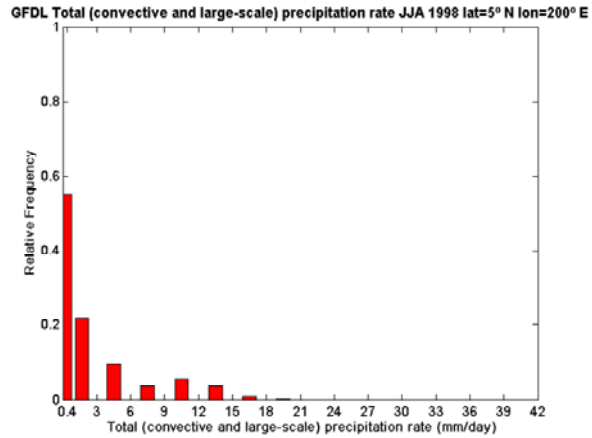




1000 hPa PBL winds in the cross-section.

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

How representative is the cross-section?

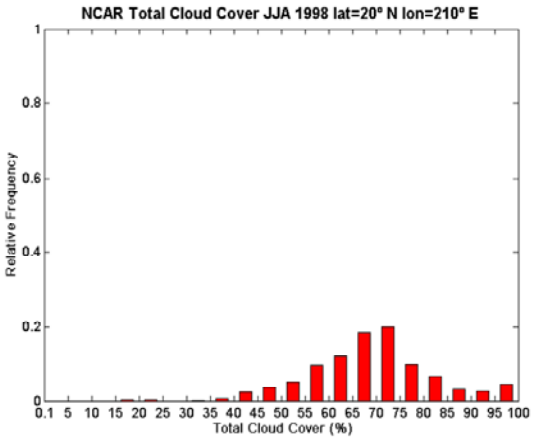
	5 N, 190 E	5 N, 195 E	5 N, 200 E
NCAR			
GFDL			

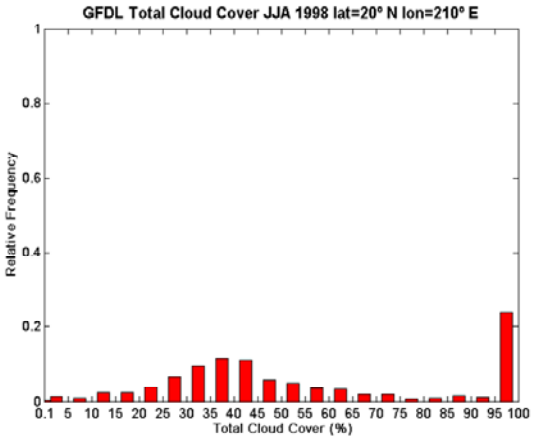
Precipitation histograms from the 2D maps.

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

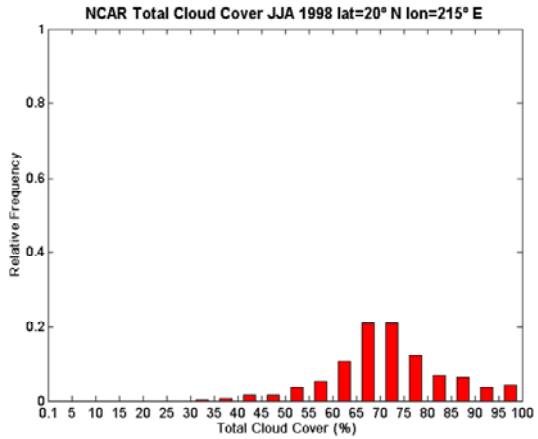
How representative is the cross-section?

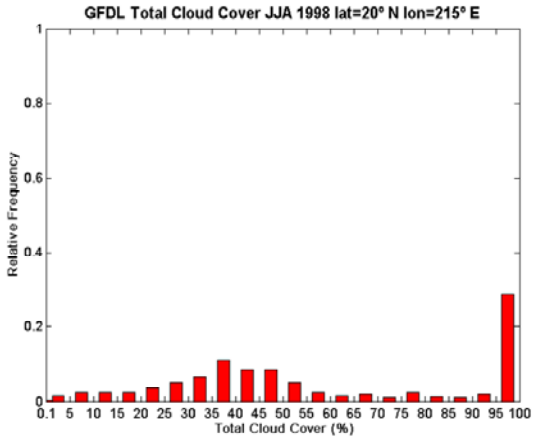
20 N, 210 E



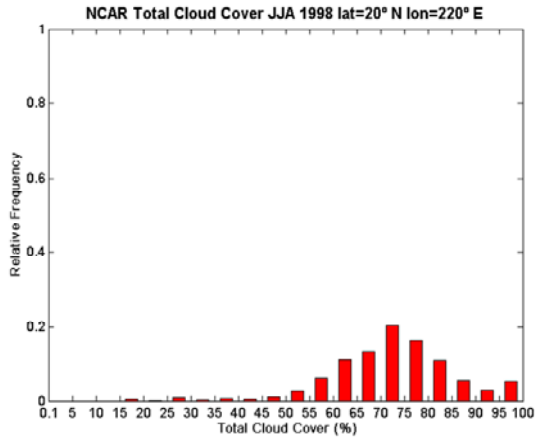


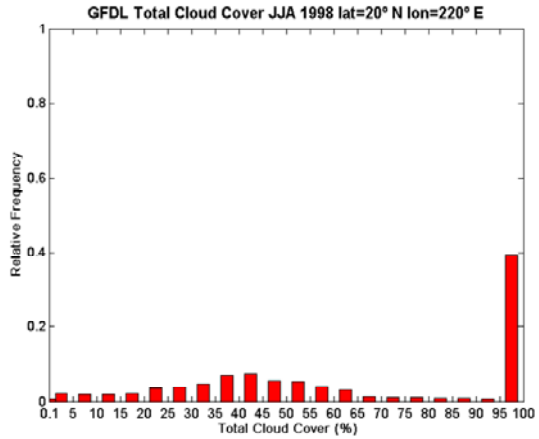
20 N, 215 E





20 N, 220 E





NCAR

GFDL

Total cloud cover histograms from the 2D maps.

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

How representative is the cross-section?

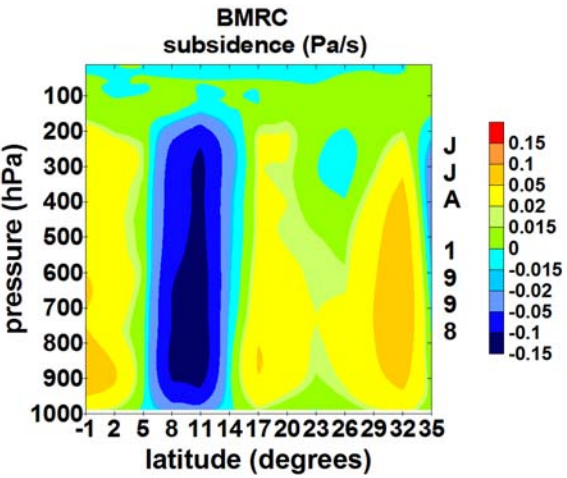
> Results from adjacent points are similar.

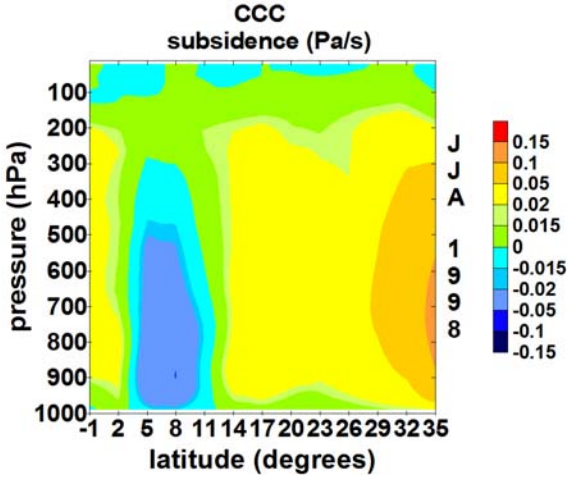
> Models are more different.

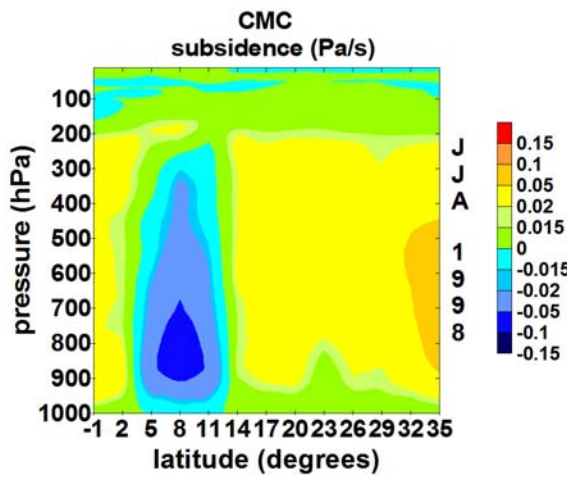
1998 Results

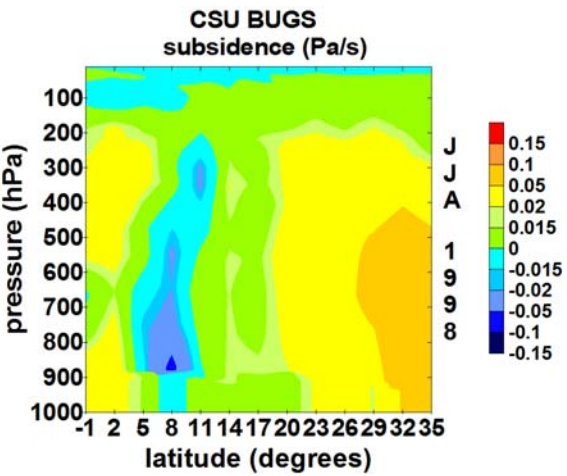
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

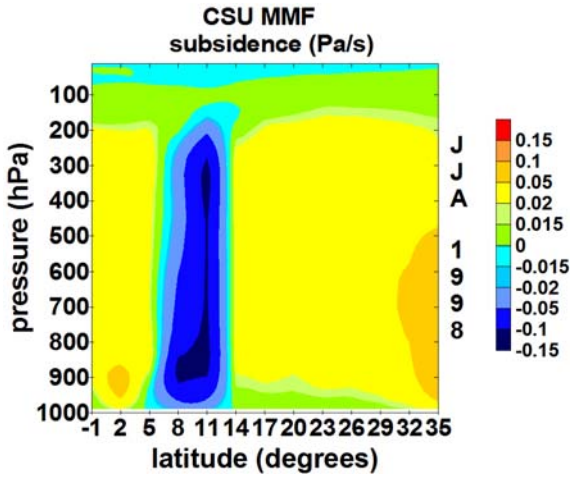
JJA 1998 mean vertical profiles. subsidence (Pa/s)

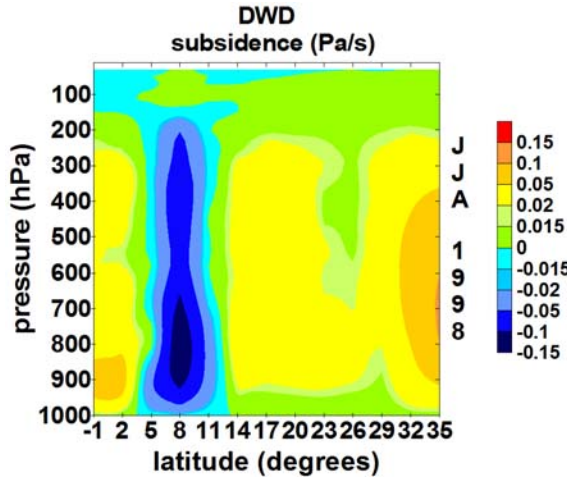






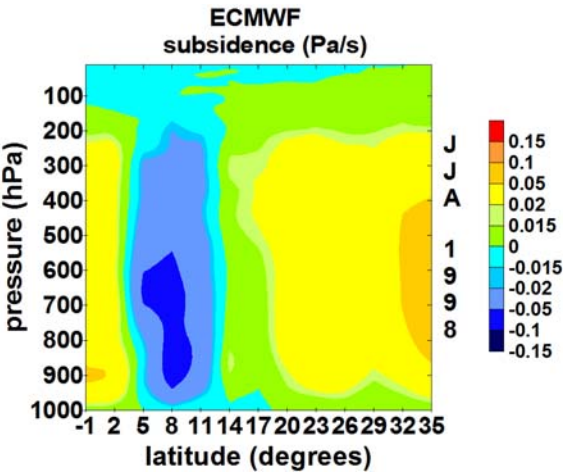


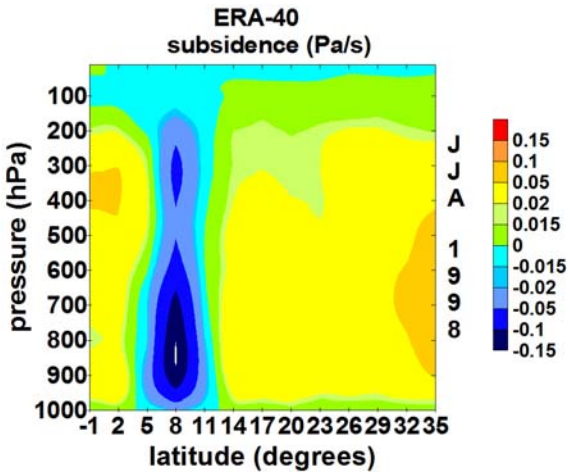


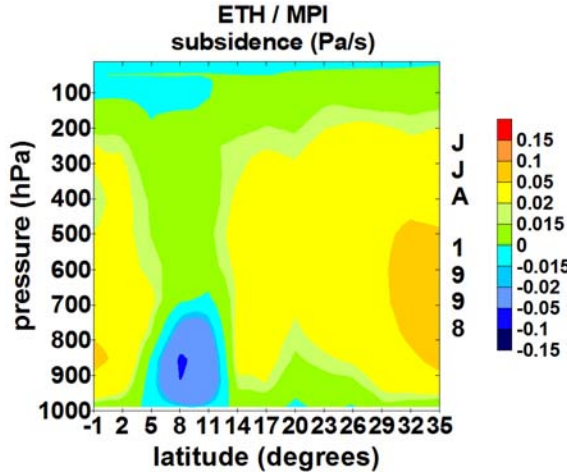


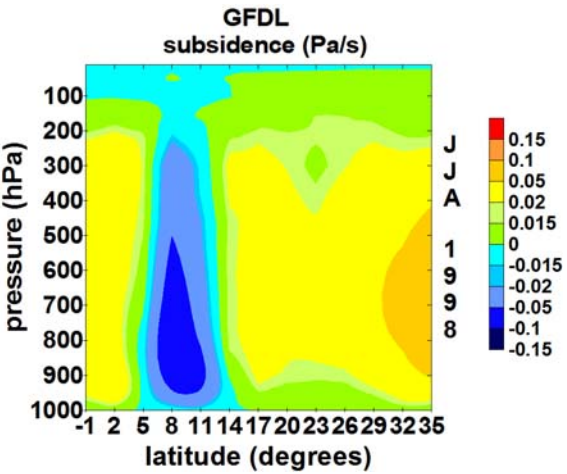
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

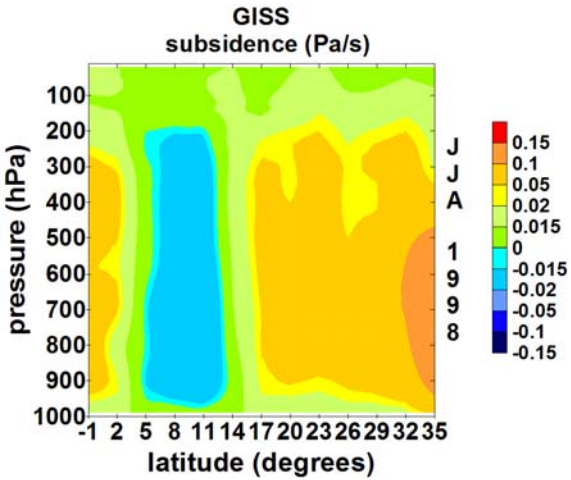
JJA 1998 mean vertical profiles. subsidence (Pa/s)

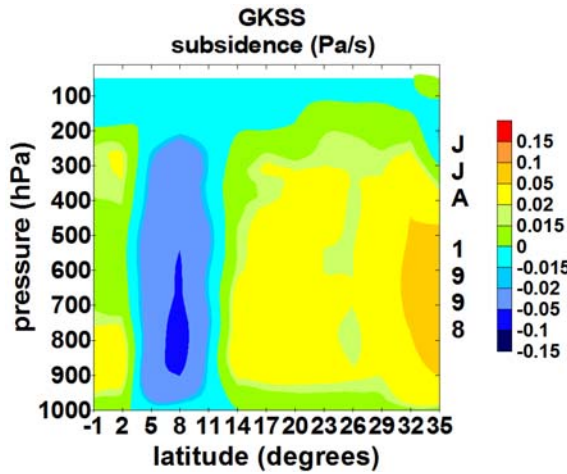






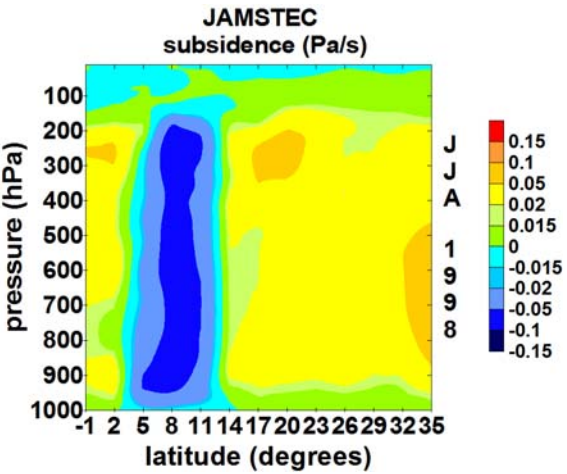


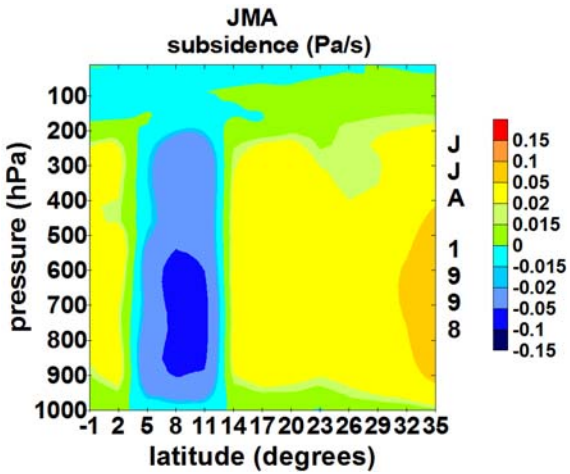


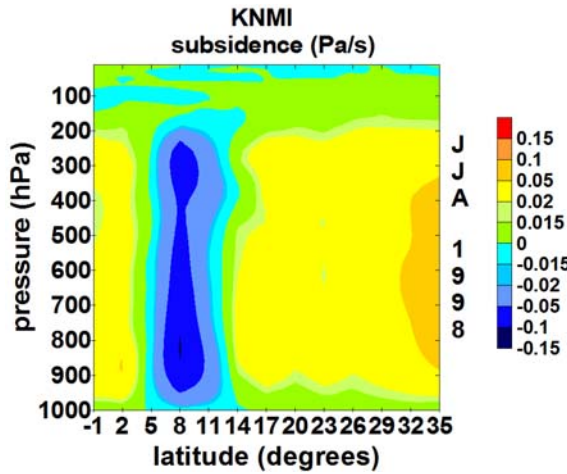


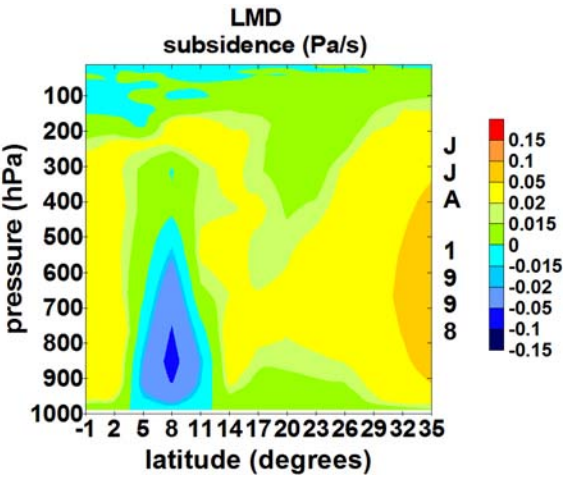
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

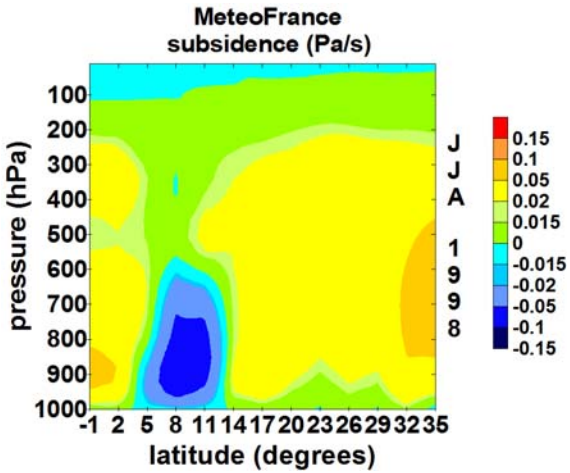
JJA 1998 mean vertical profiles. subsidence (Pa/s)

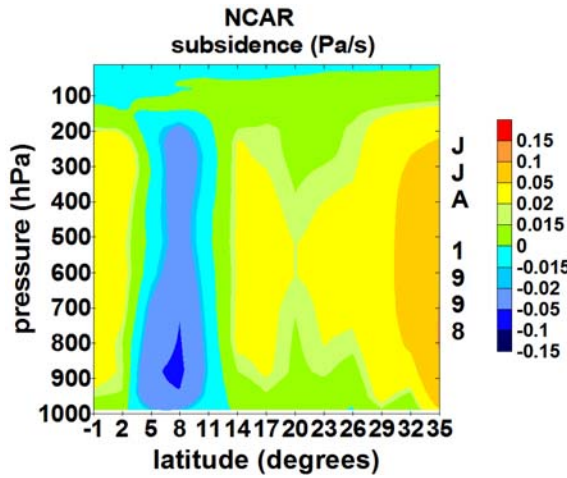






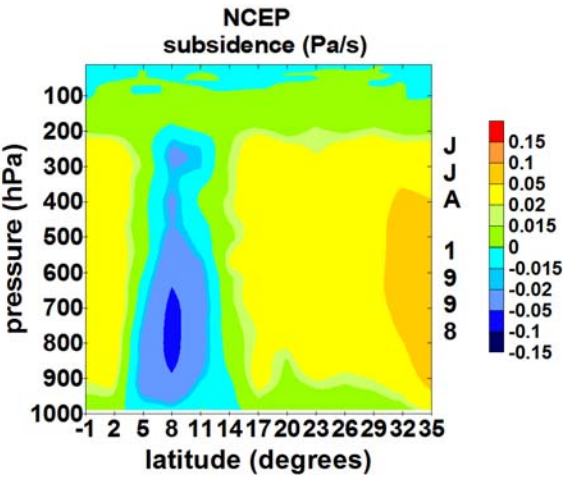


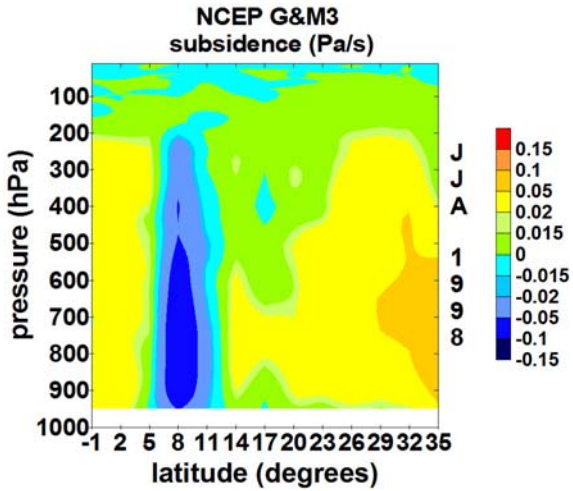


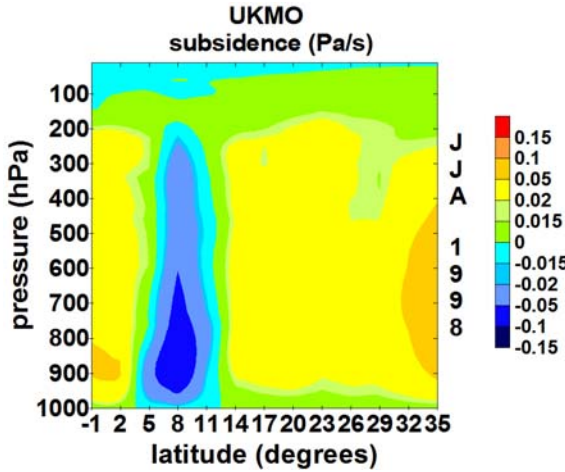


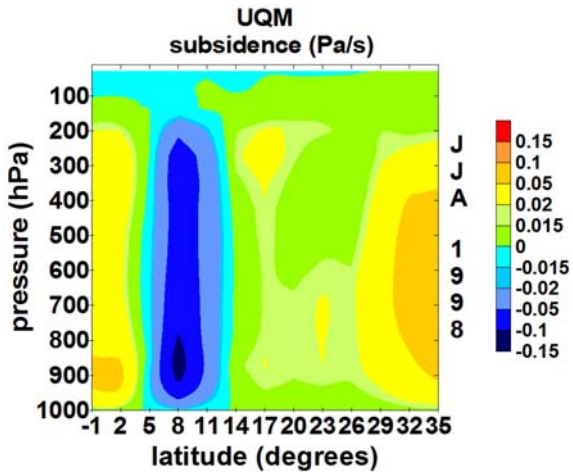
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean vertical profiles. subsidence (Pa/s)



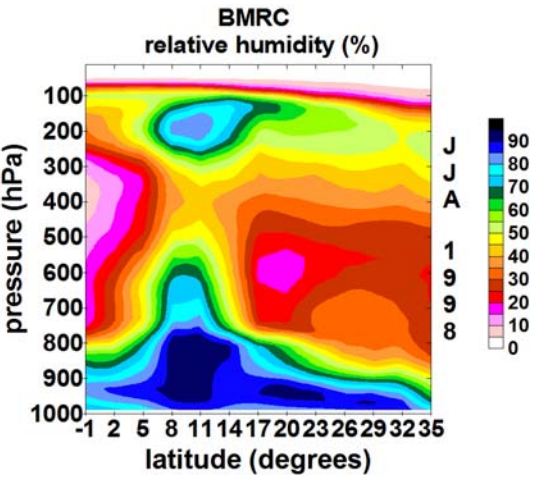


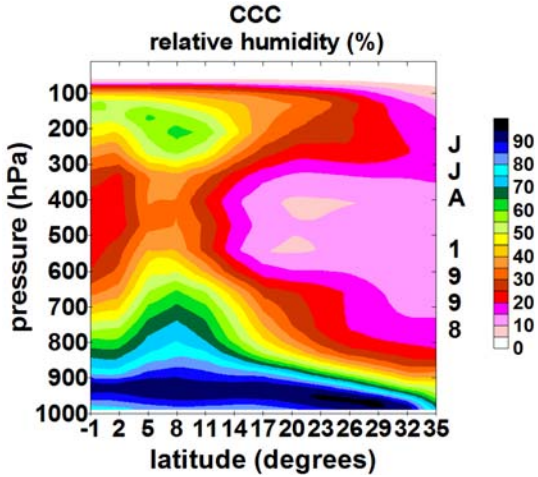


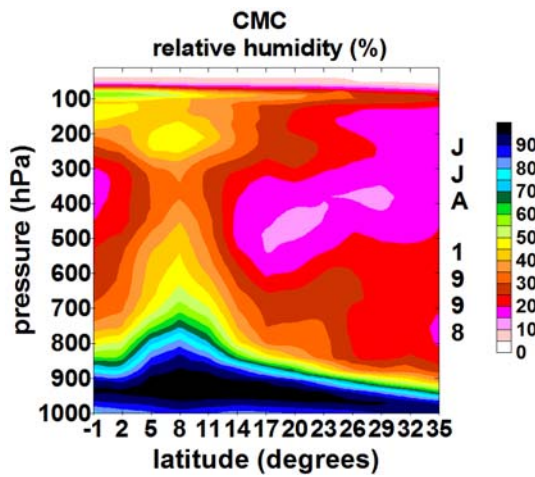


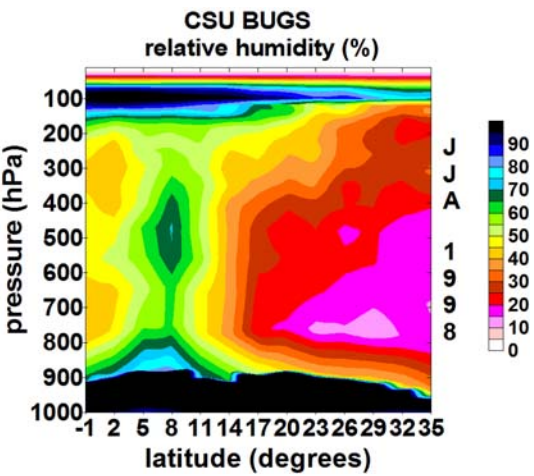
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

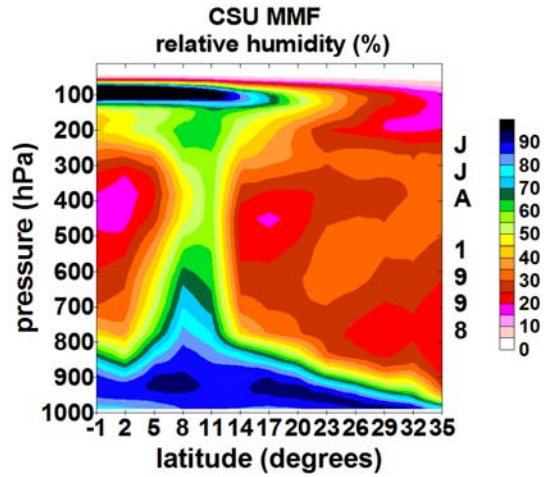
JJA 1998 mean vertical profiles. relative humidity (%)

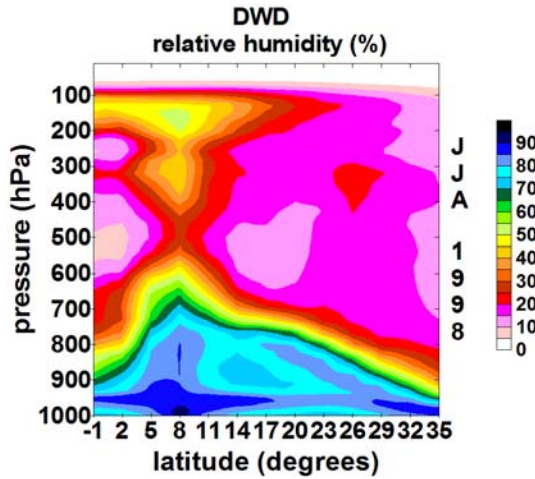






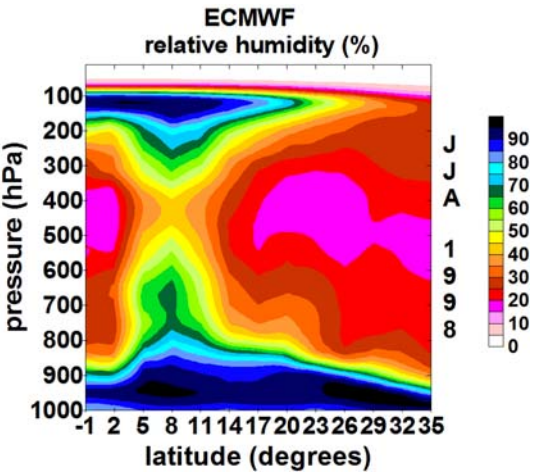


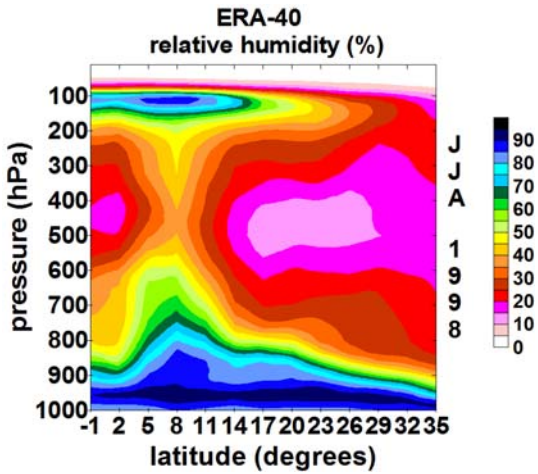


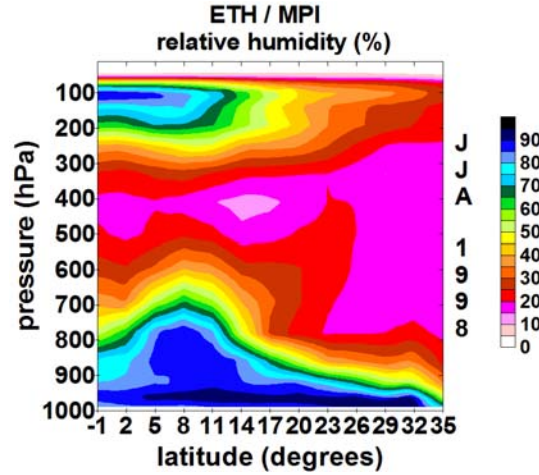


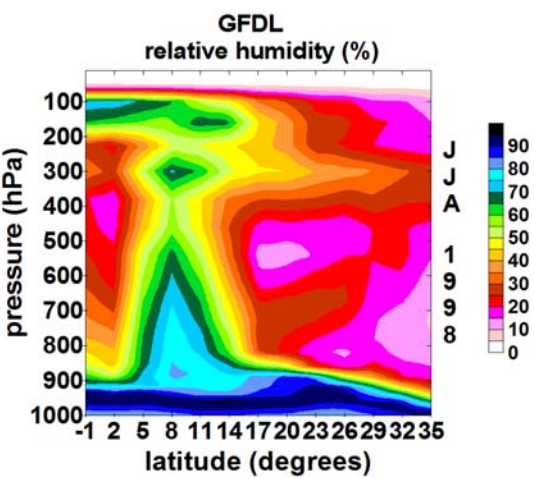
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

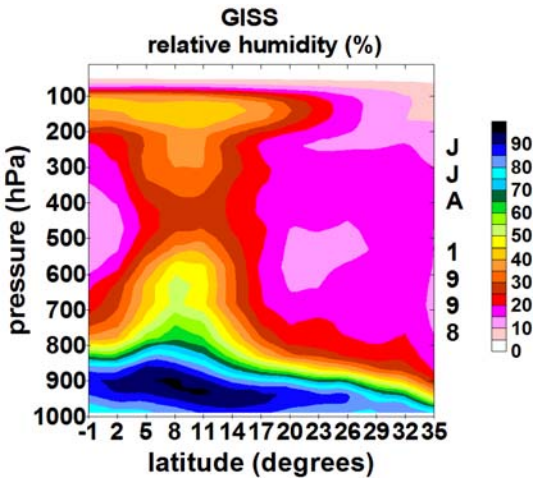
JJA 1998 mean vertical profiles. relative humidity (%)

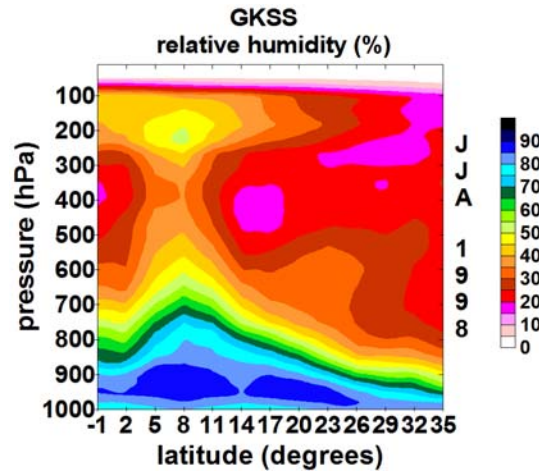






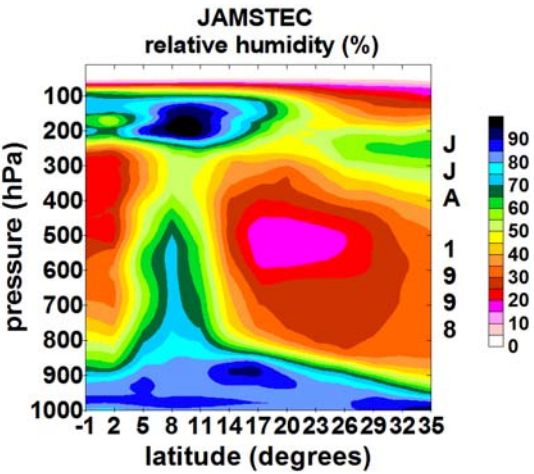


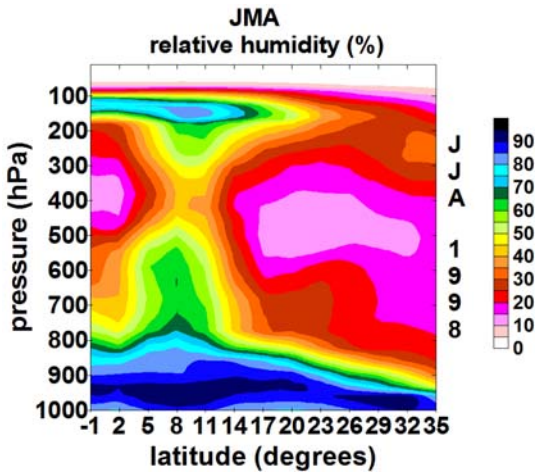


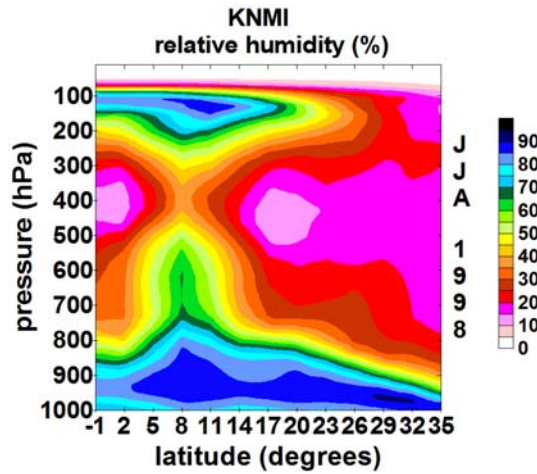


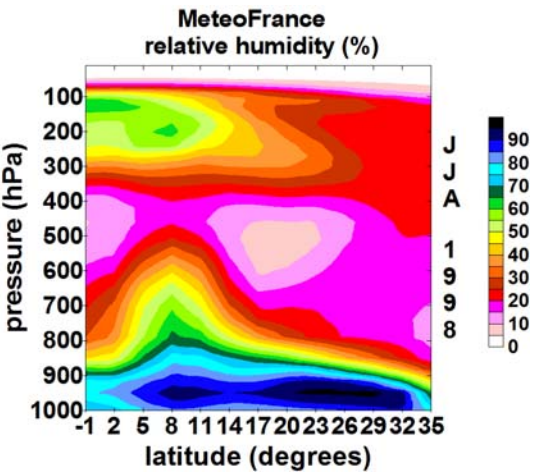
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

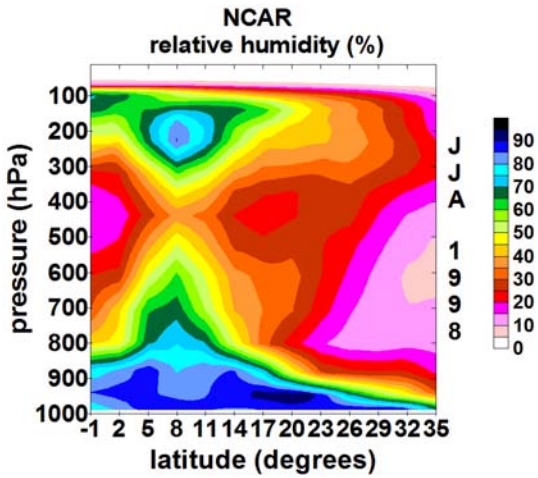
JJA 1998 mean vertical profiles. relative humidity (%)

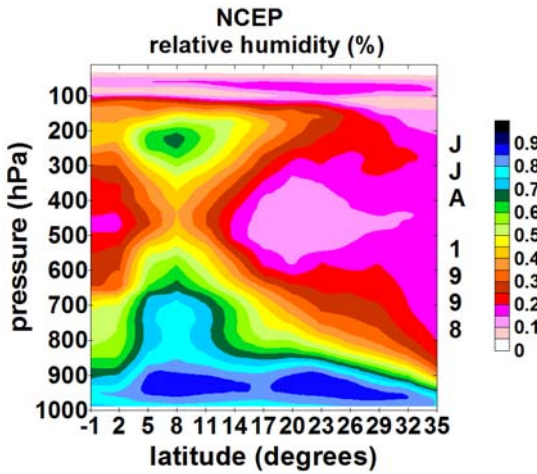






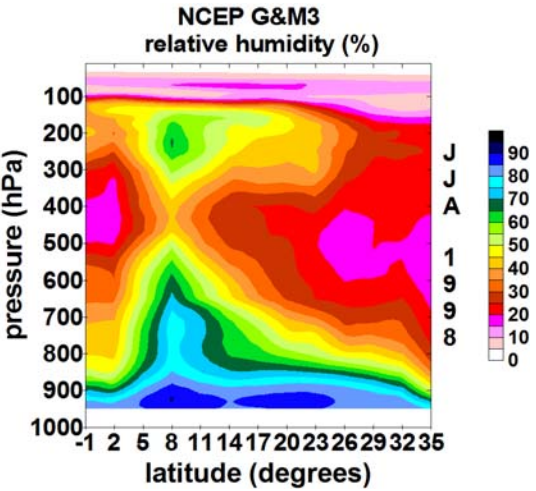


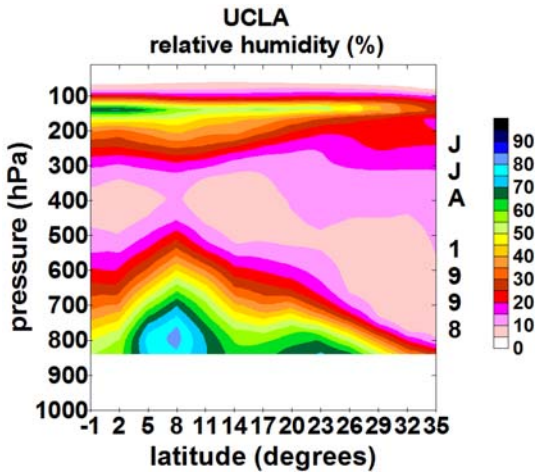


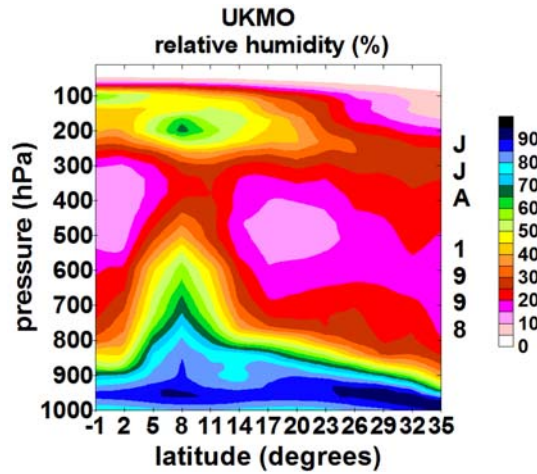


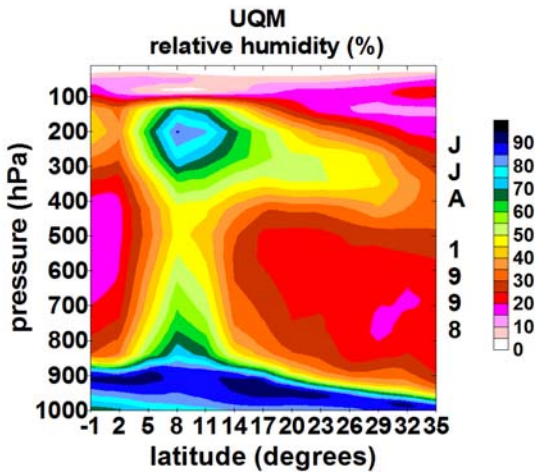
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean vertical profiles. relative humidity (%)



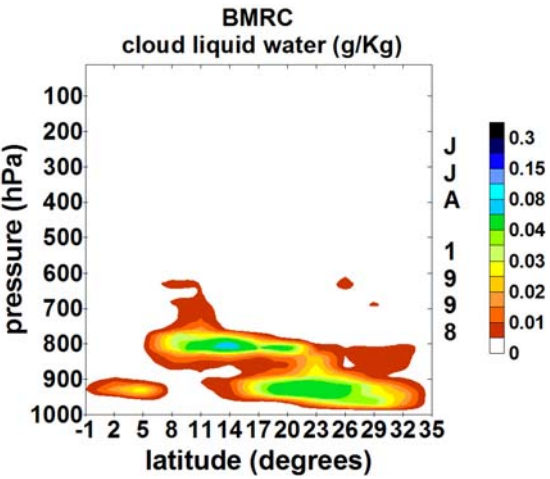


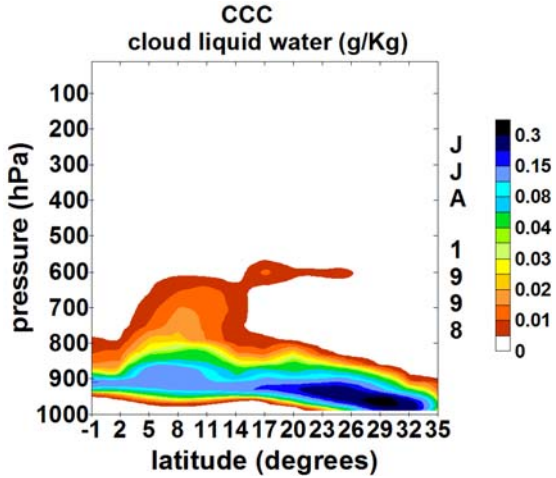


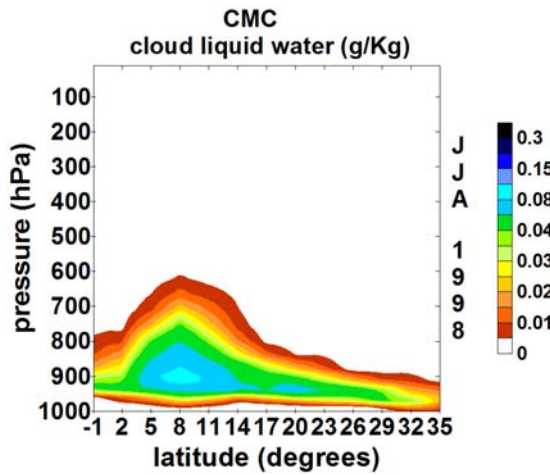


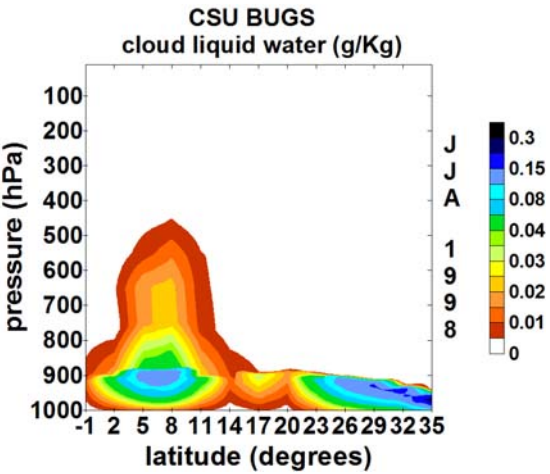
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

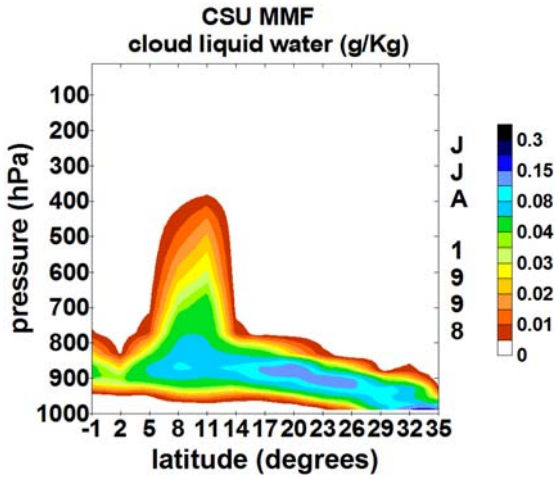
JJA 1998 mean vertical profiles. cloud liquid water (g/Kg)

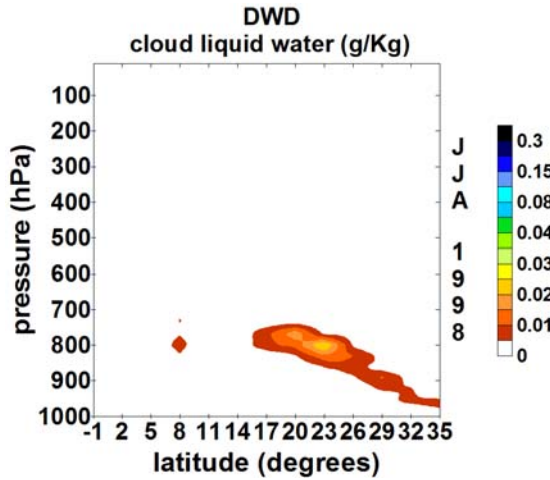






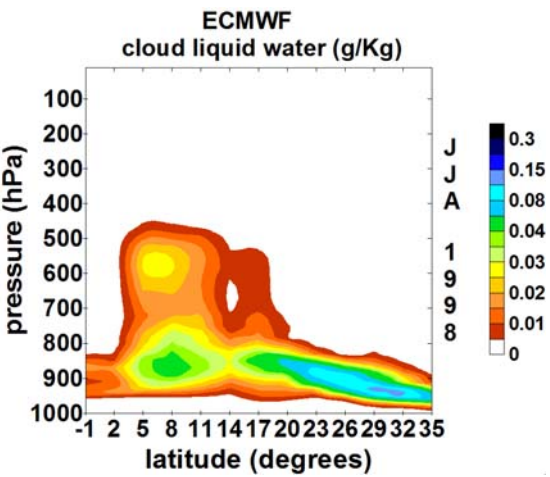


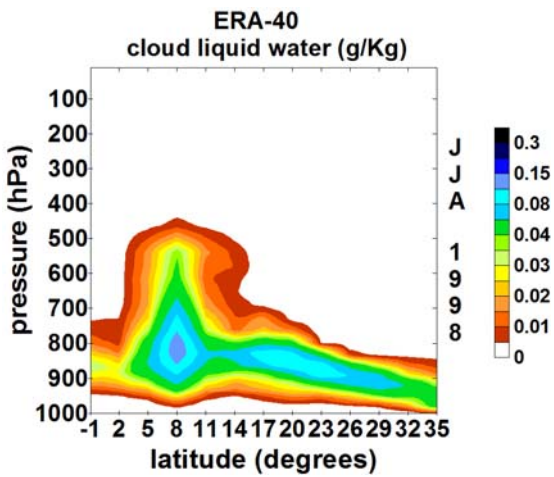


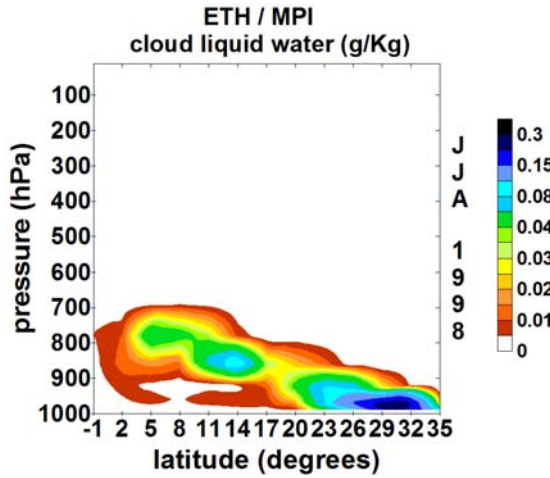


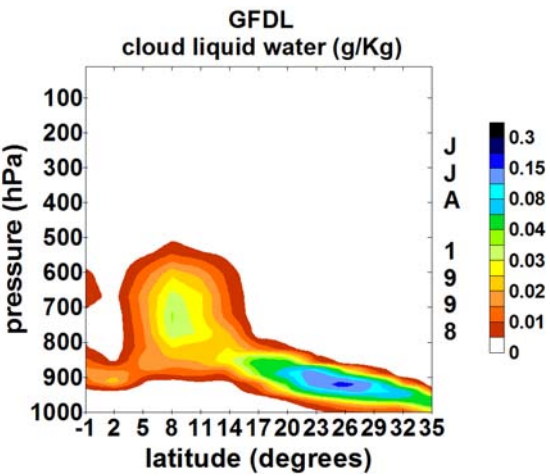
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

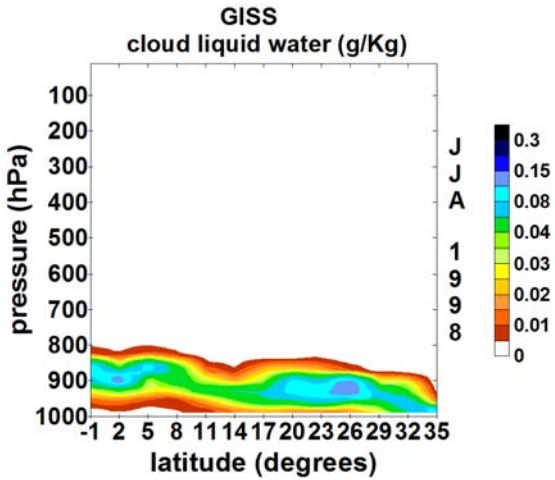
JJA 1998 mean vertical profiles. cloud liquid water (g/Kg)

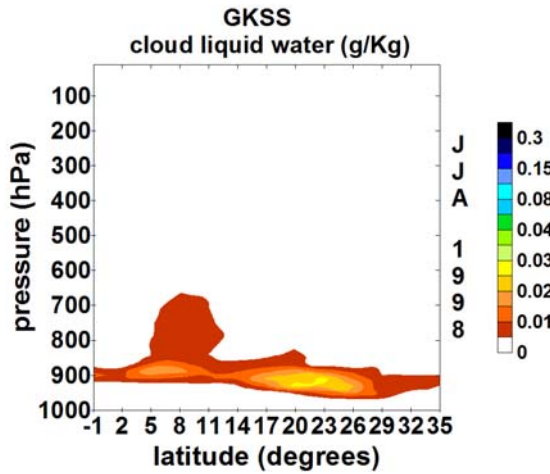






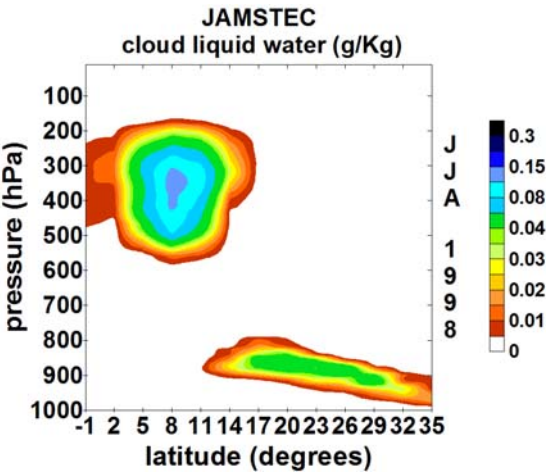


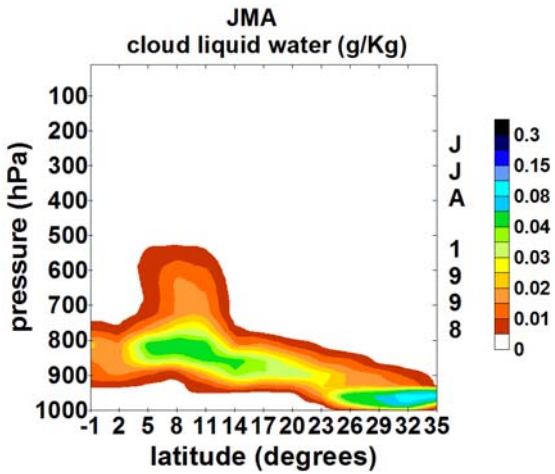


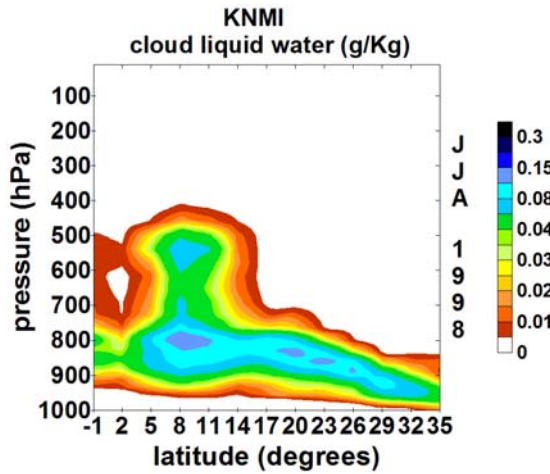


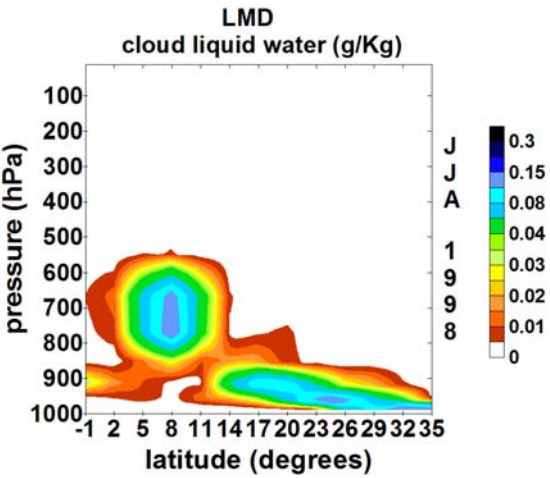
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

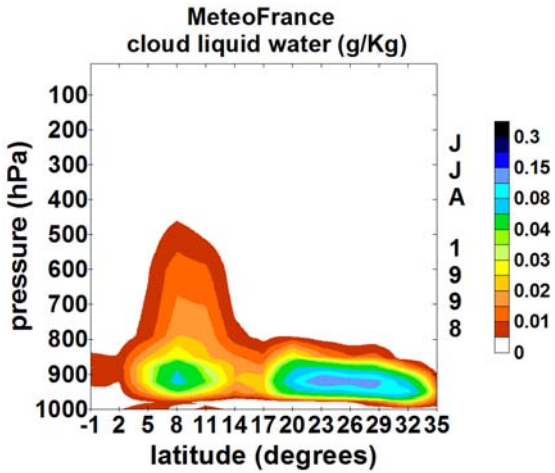
JJA 1998 mean vertical profiles. cloud liquid water (g/Kg)

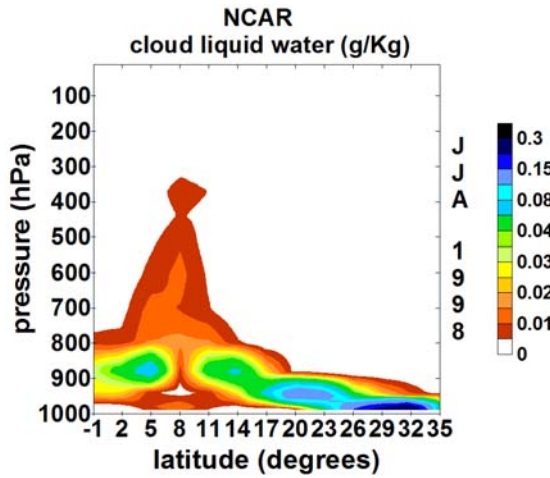






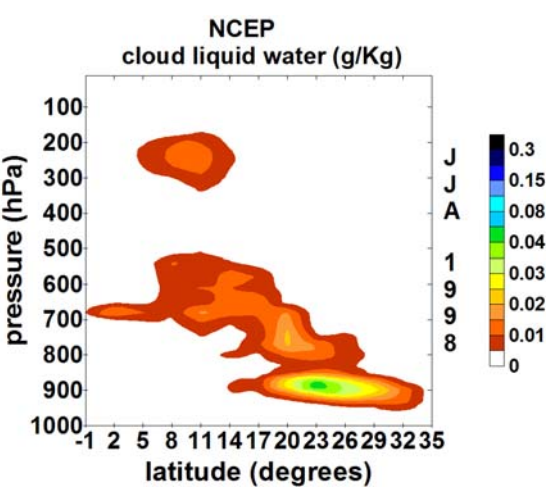


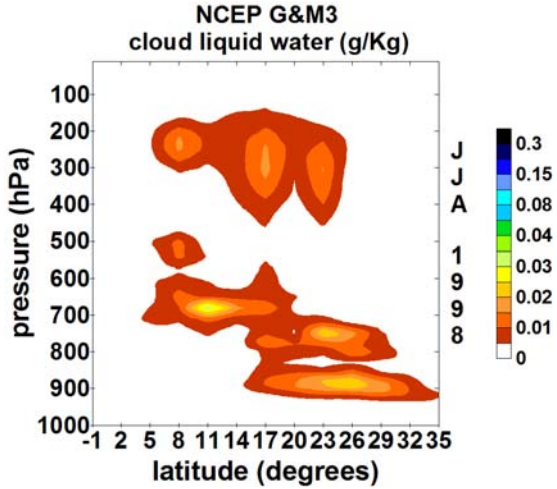


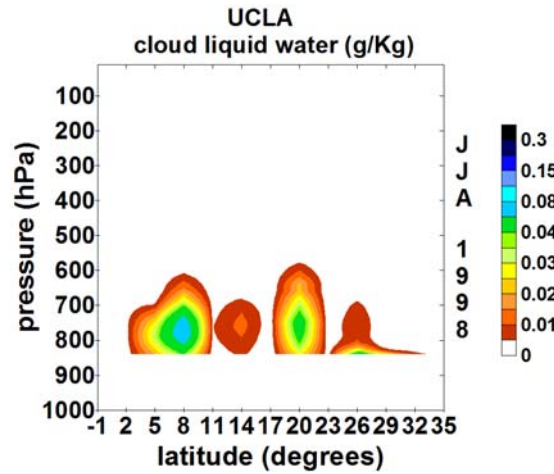


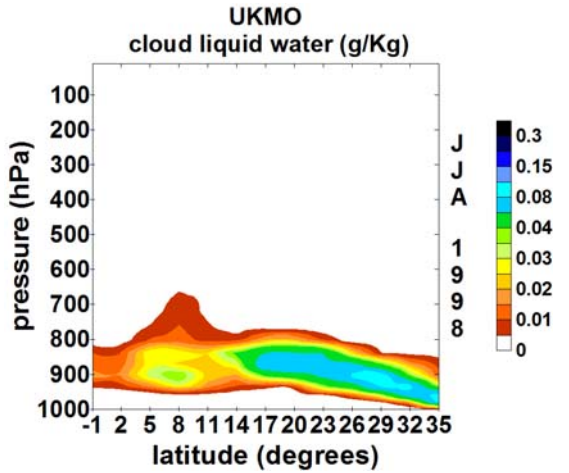
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

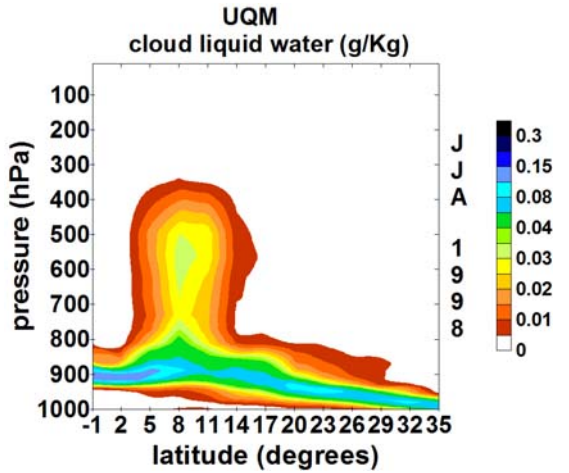
JJA 1998 mean vertical profiles. cloud liquid water (g/Kg)





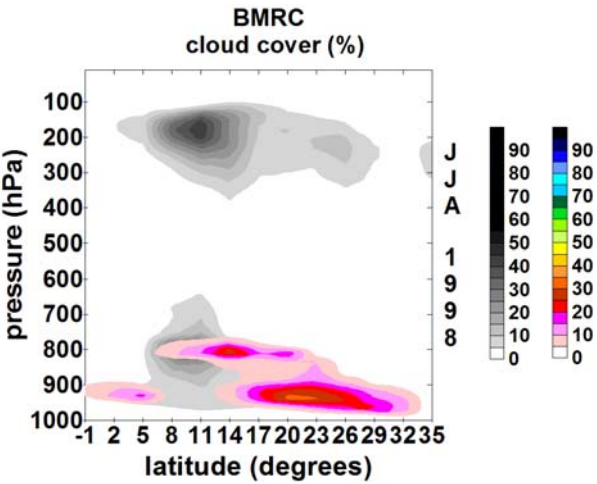


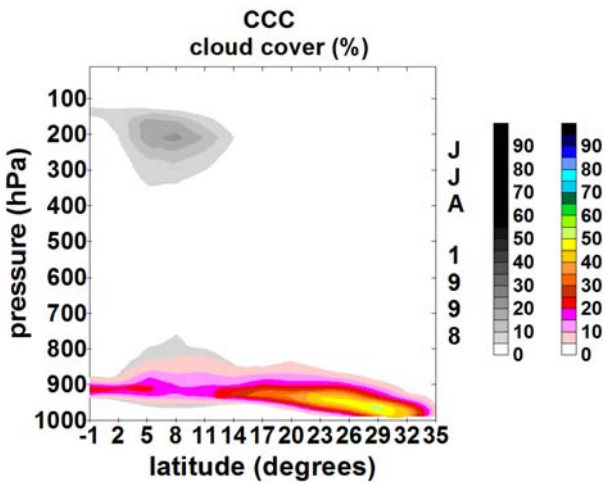


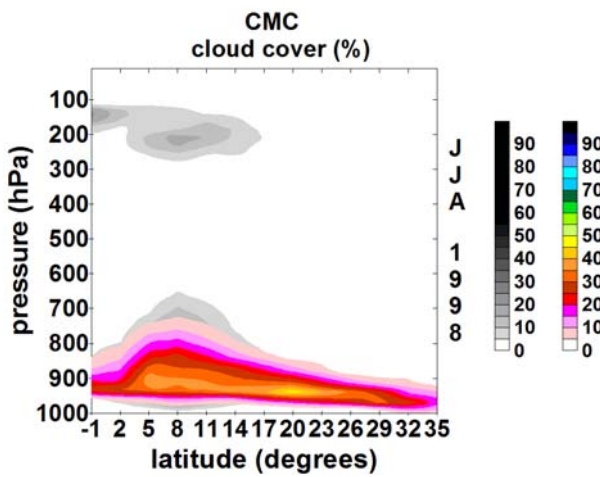


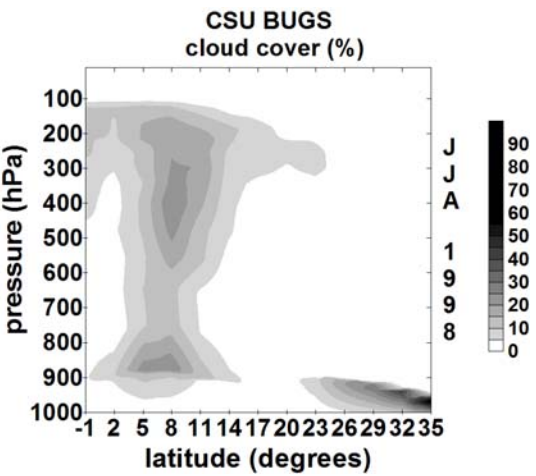
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

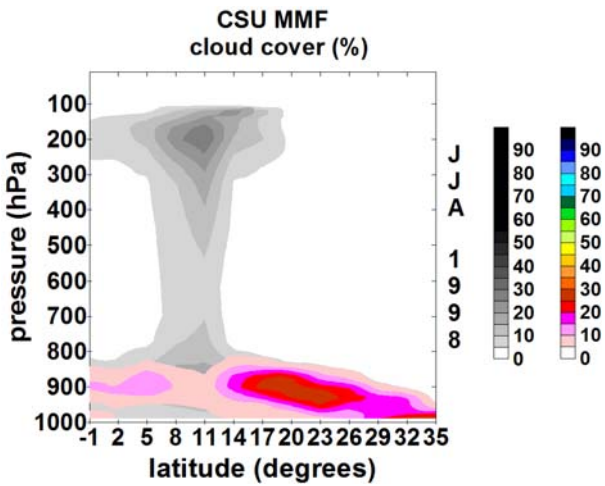
JJA 1998 mean vertical profiles. cloud cover (%)

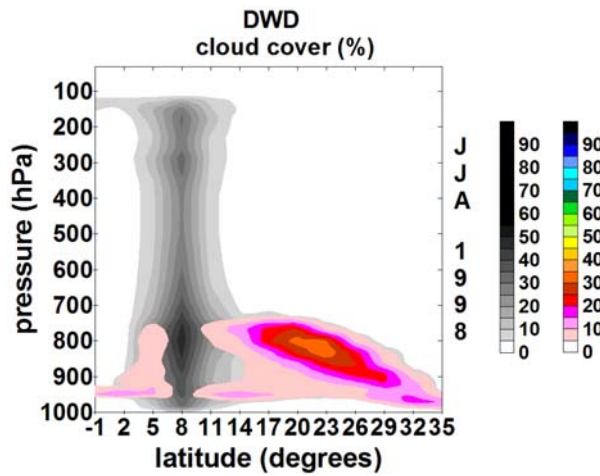






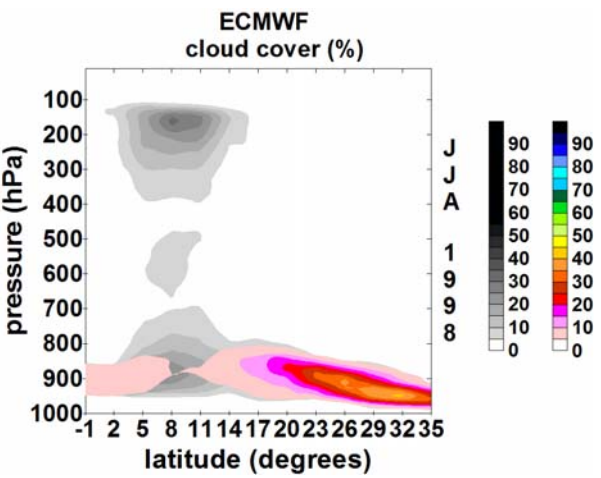


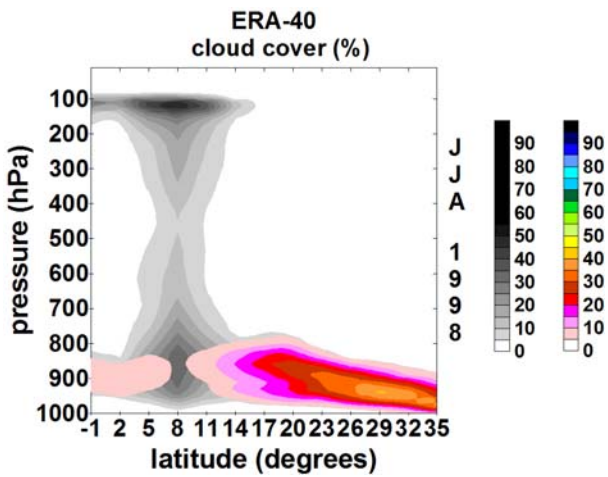


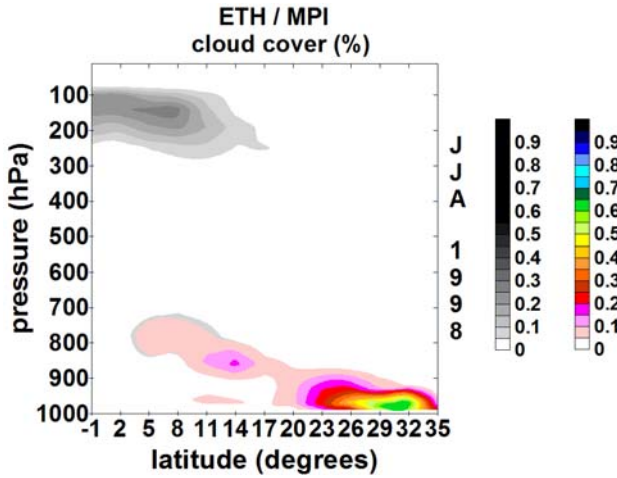


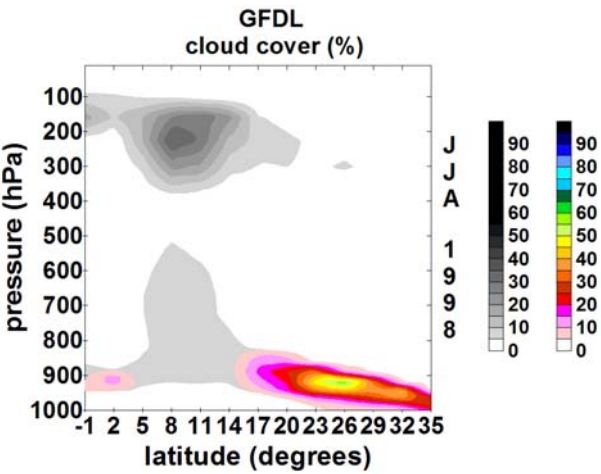
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

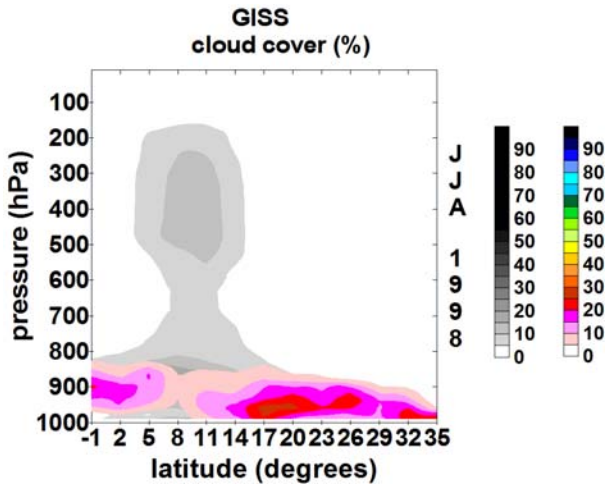
JJA 1998 mean vertical profiles. cloud cover (%)

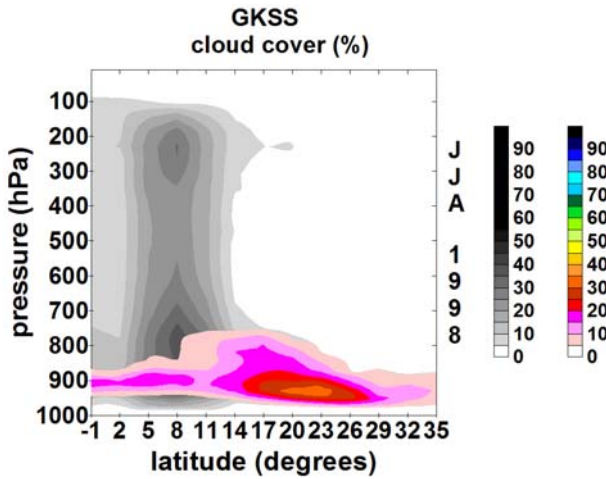






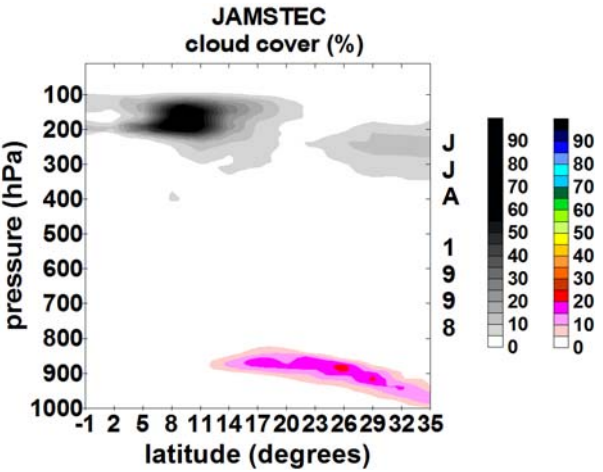


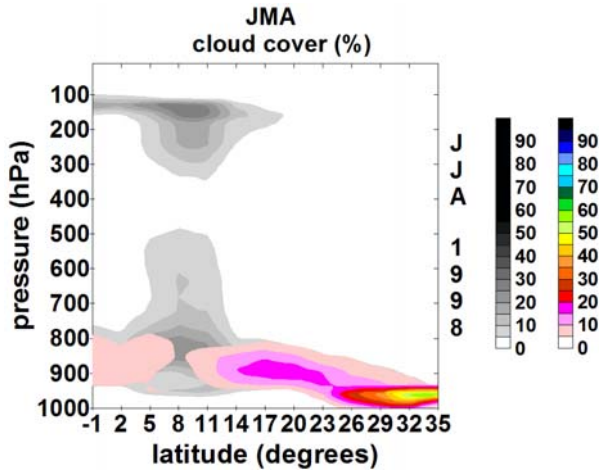


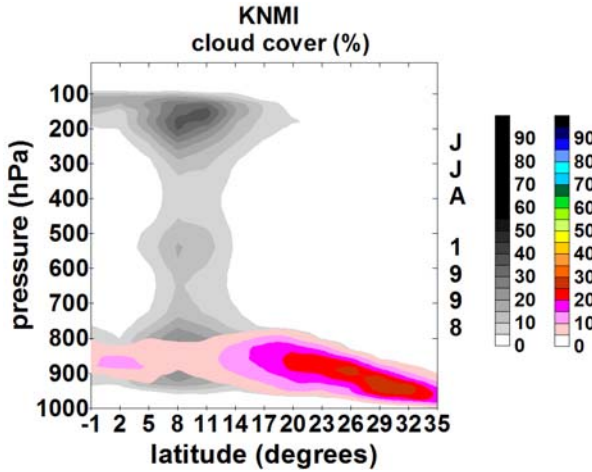


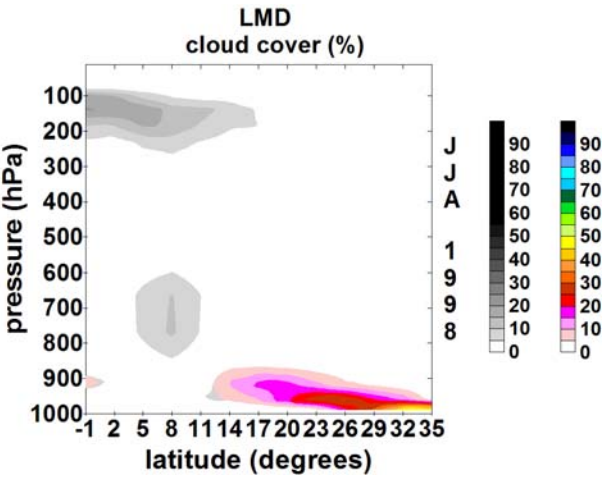
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

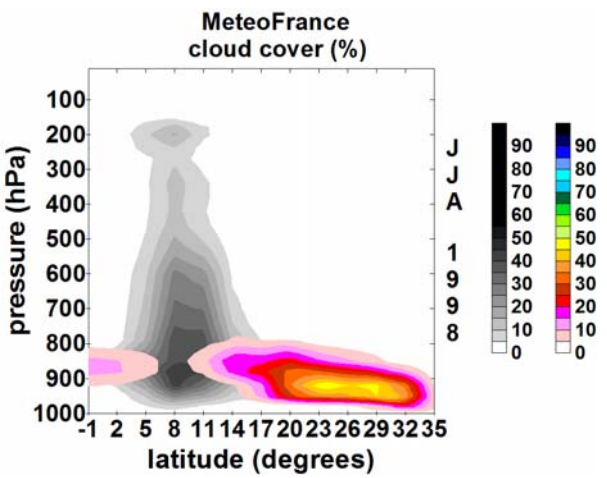
JJA 1998 mean vertical profiles. cloud cover (%)

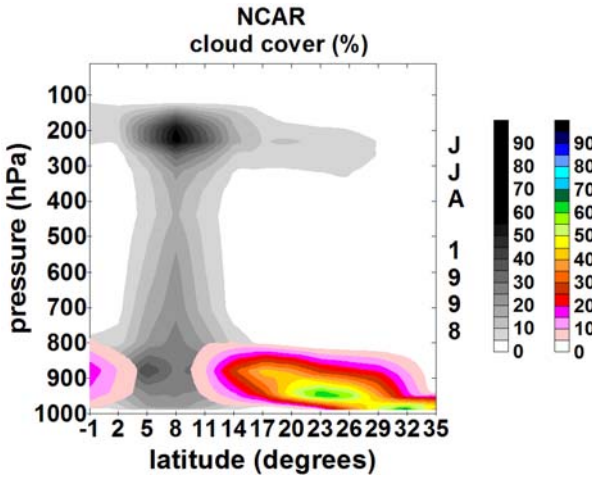






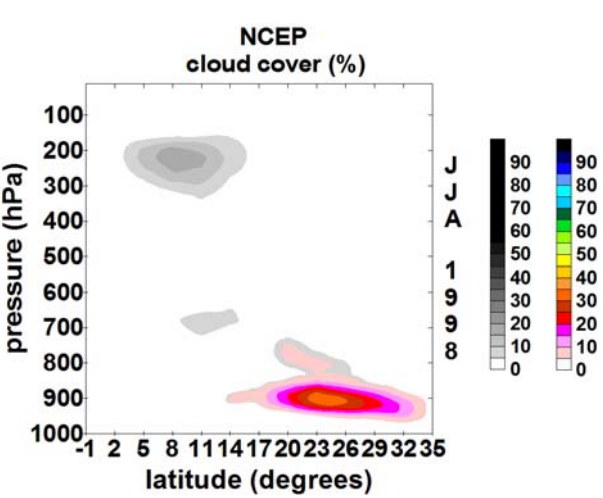


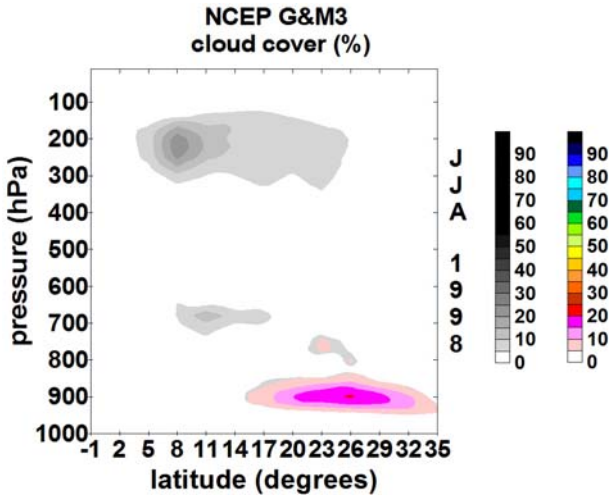


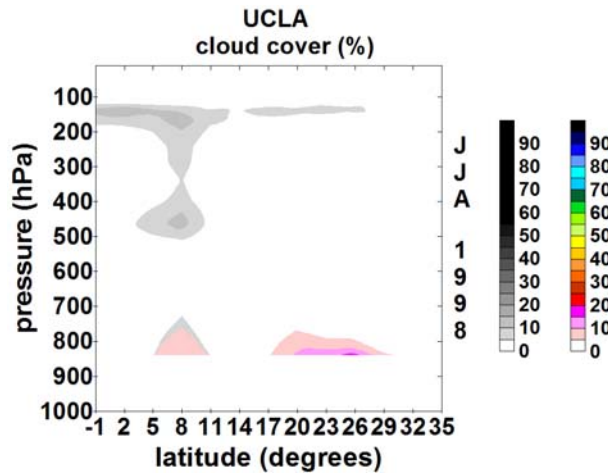


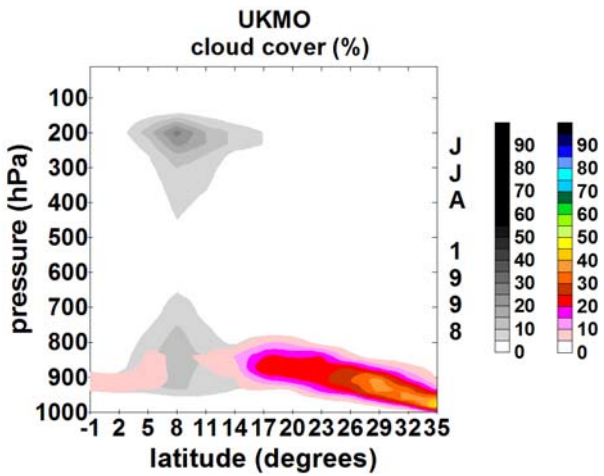
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

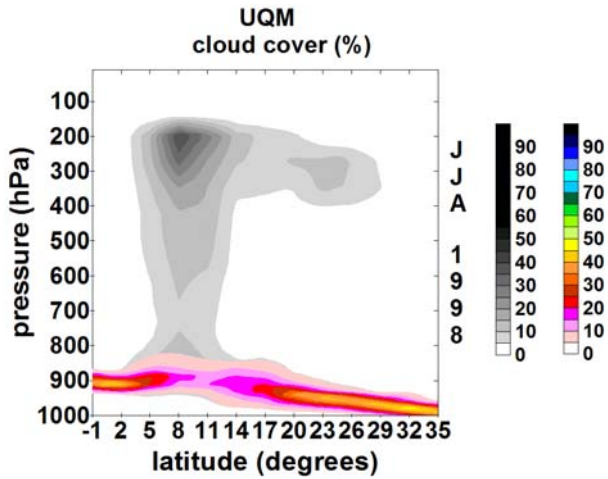
JJA 1998 mean vertical profiles. cloud cover (%)





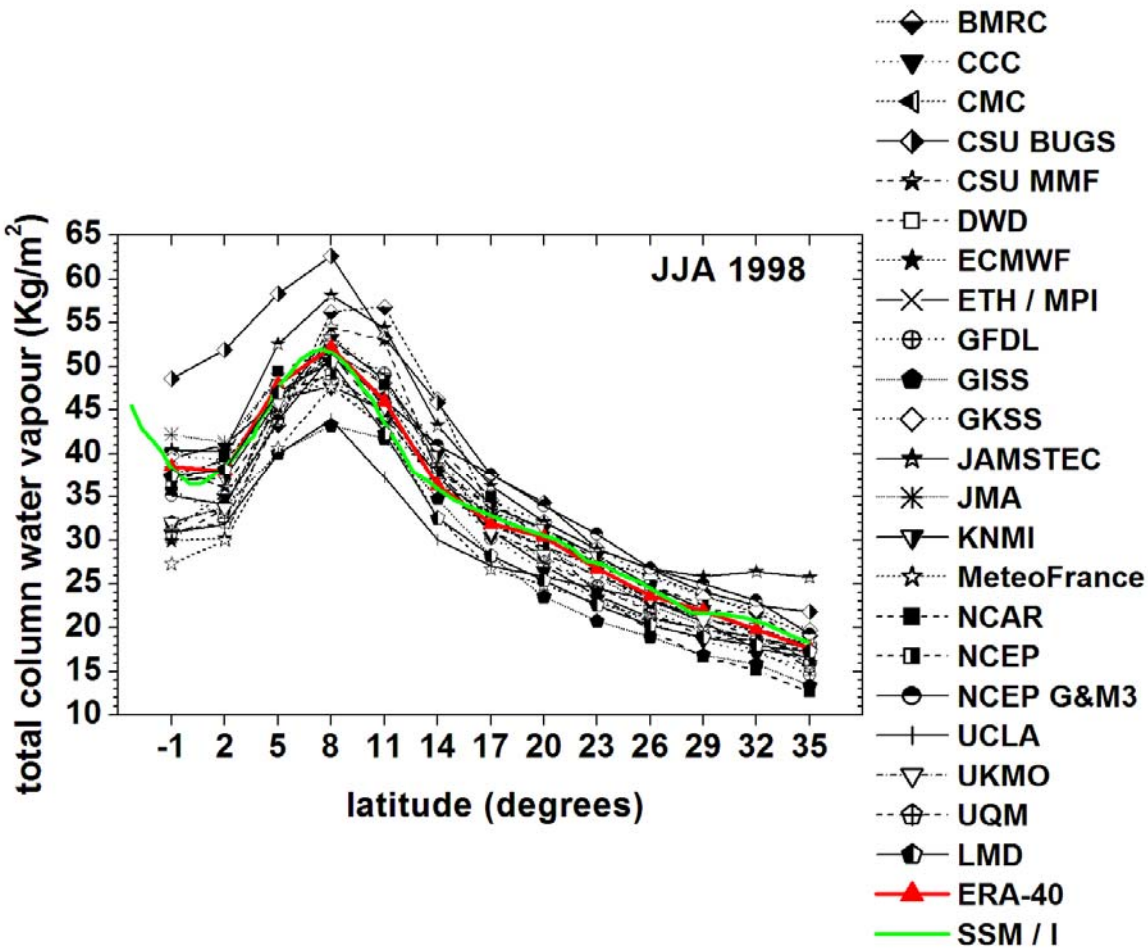






GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean sections for single-level parameters.



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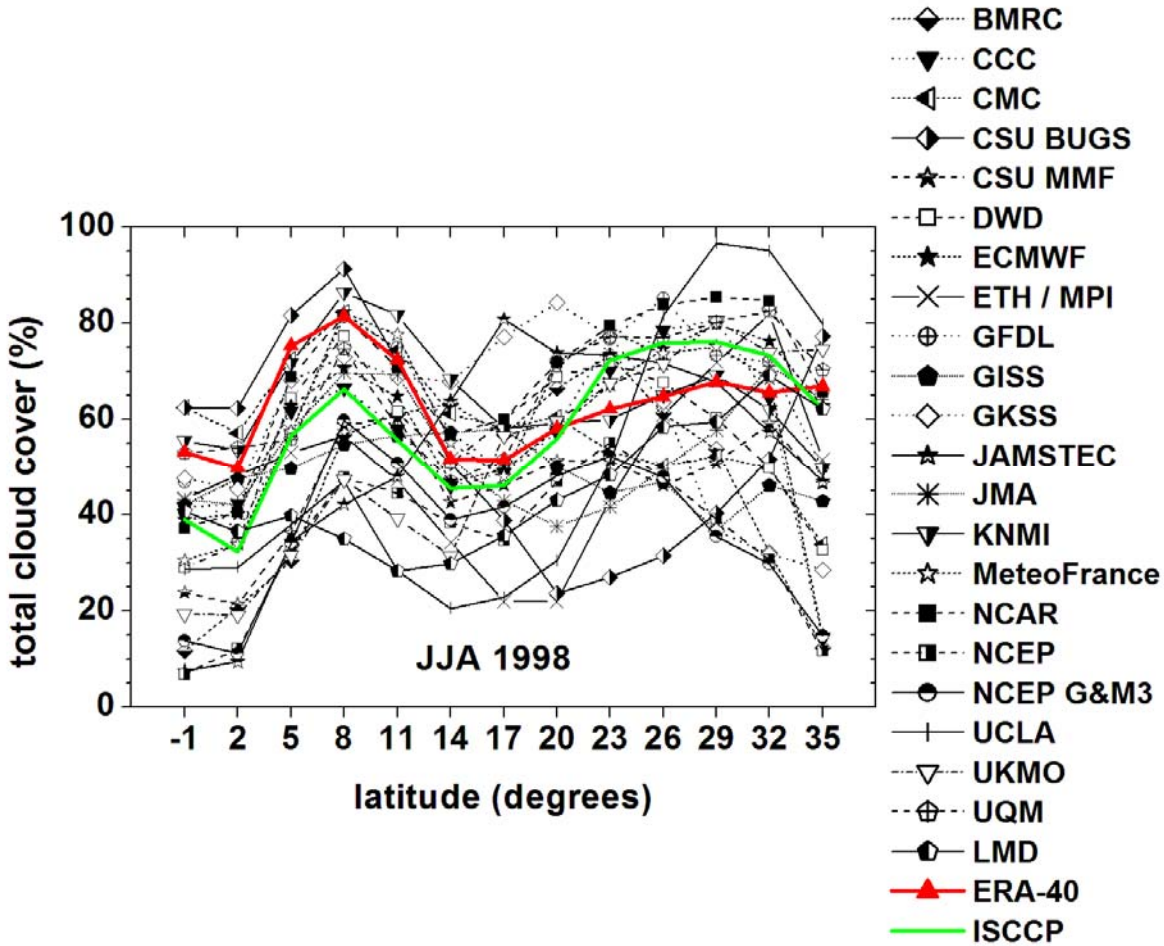

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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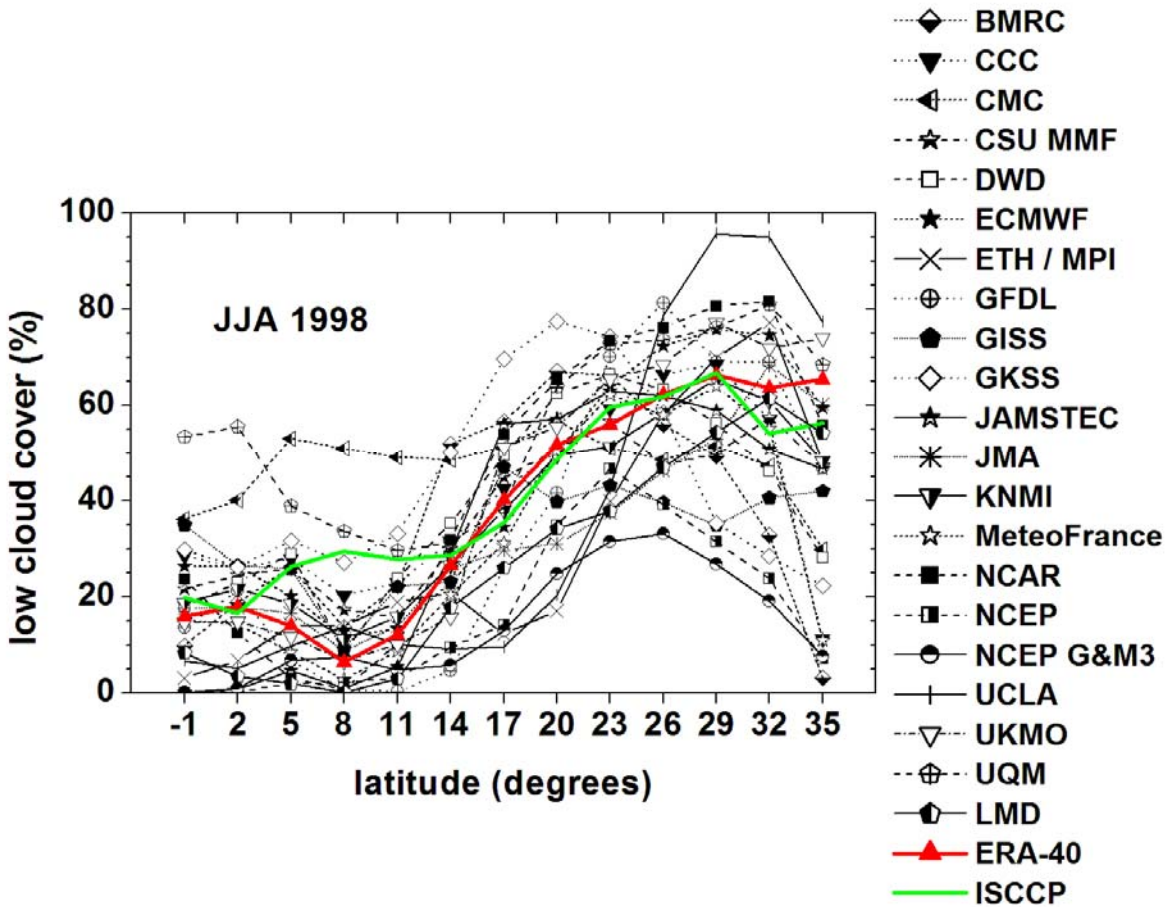

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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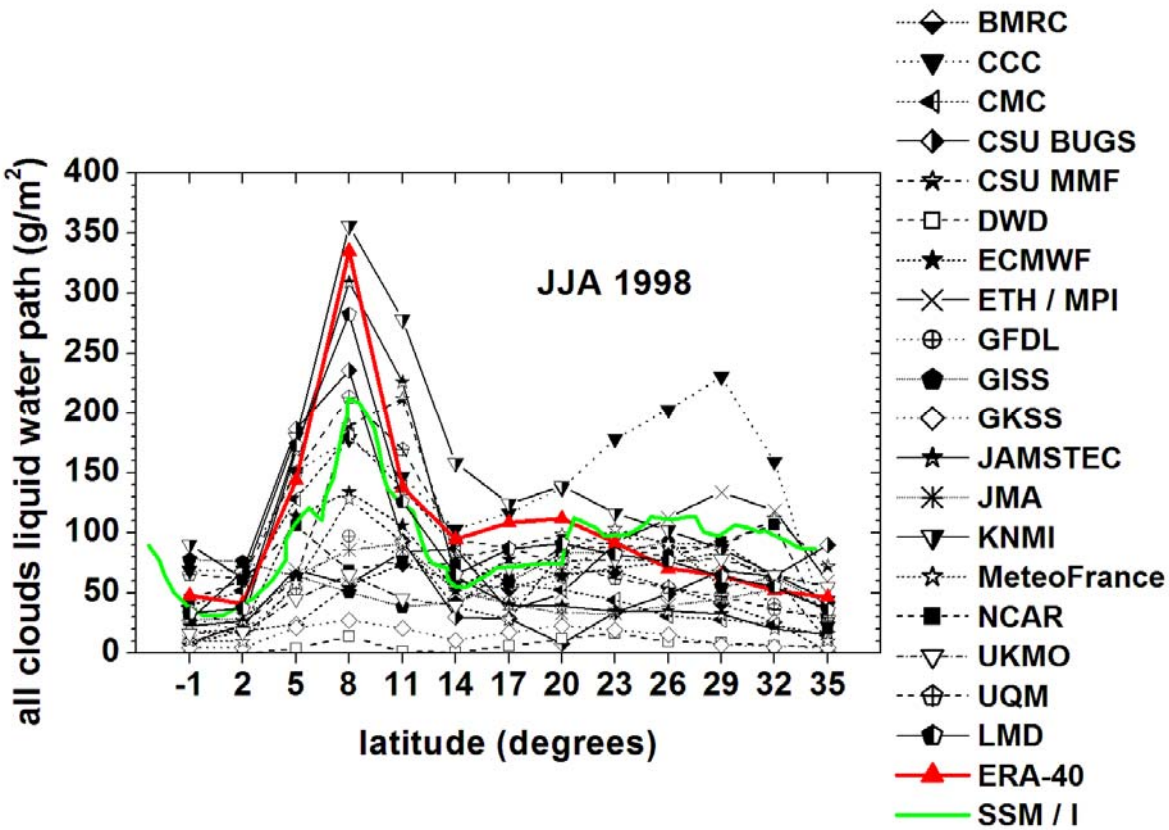

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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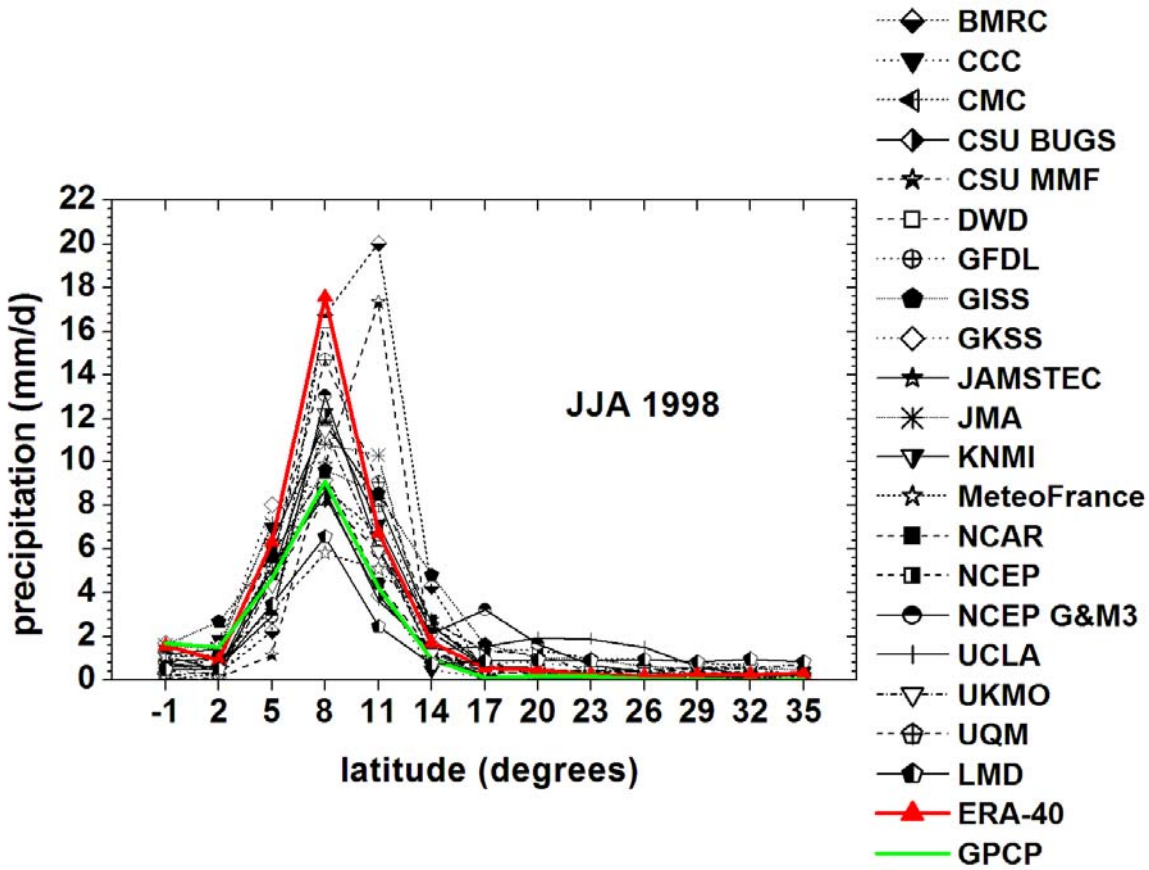

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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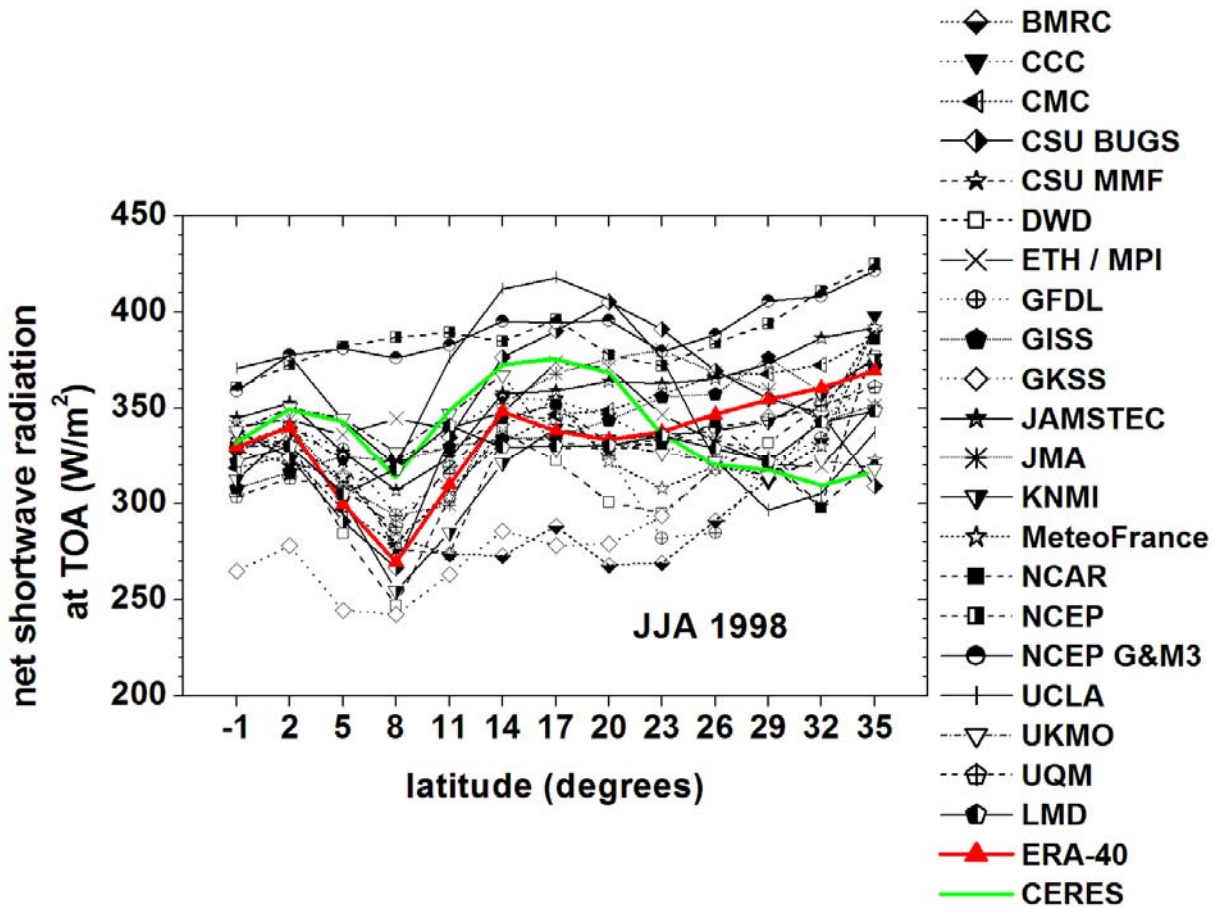

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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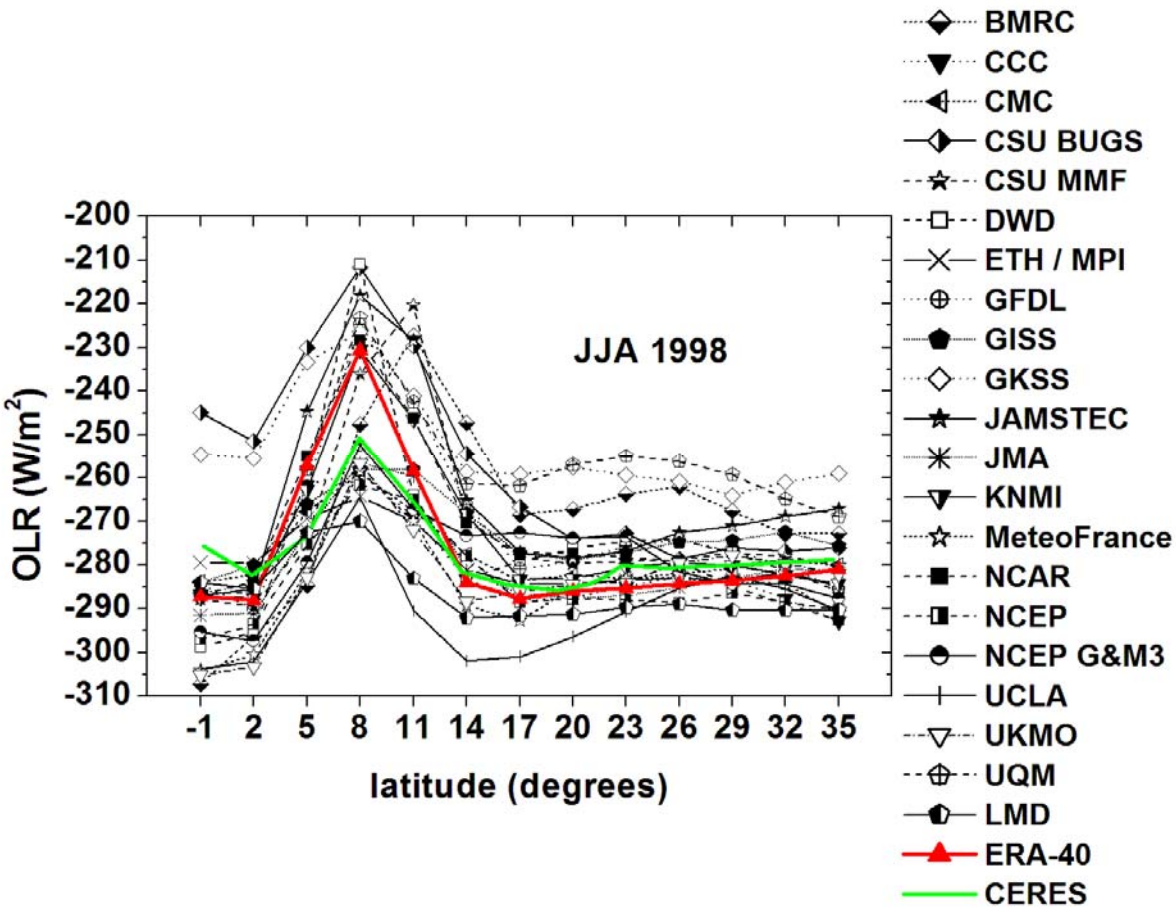

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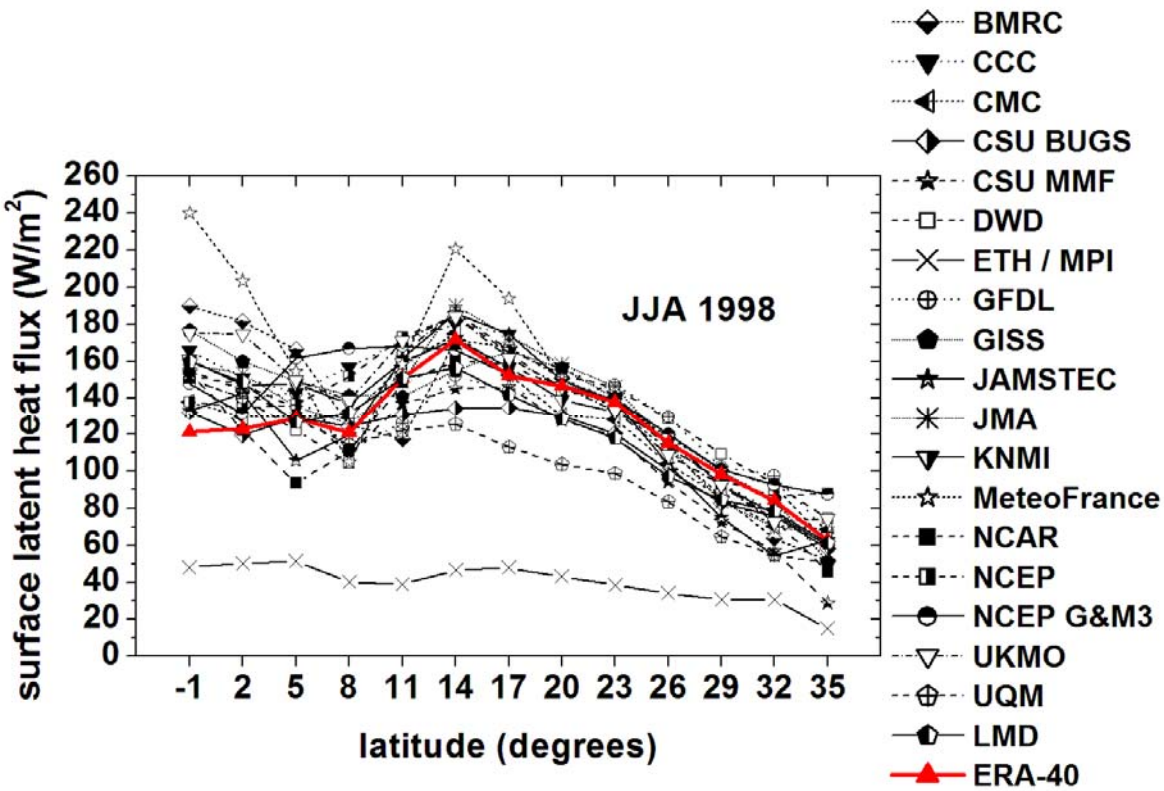
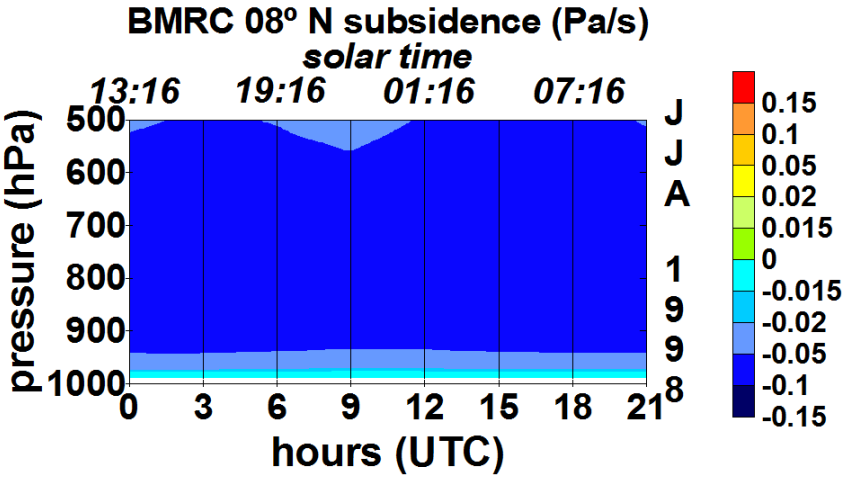
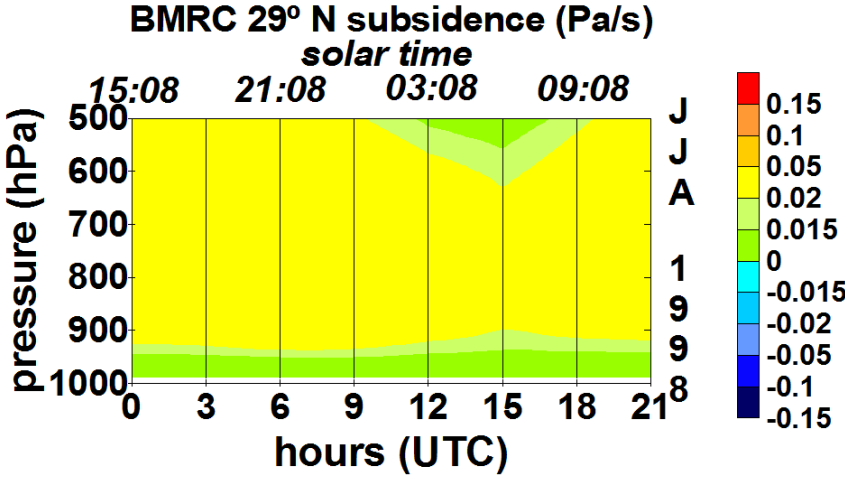
JJA 1998 mean sections for single-level parameters.

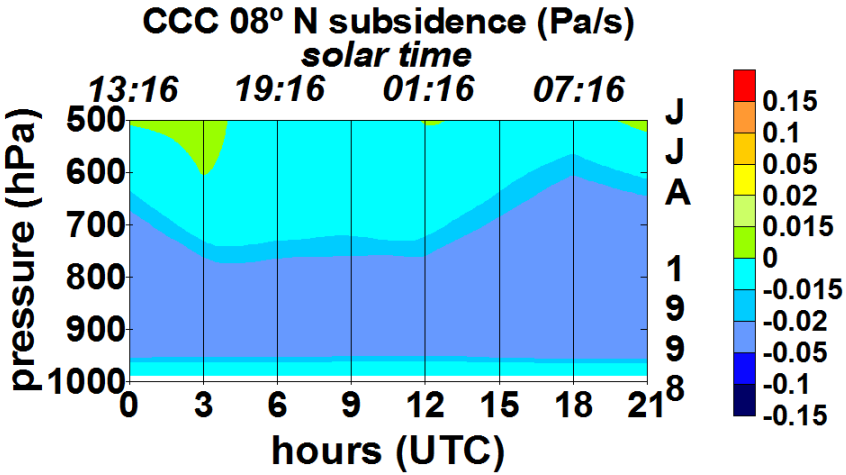


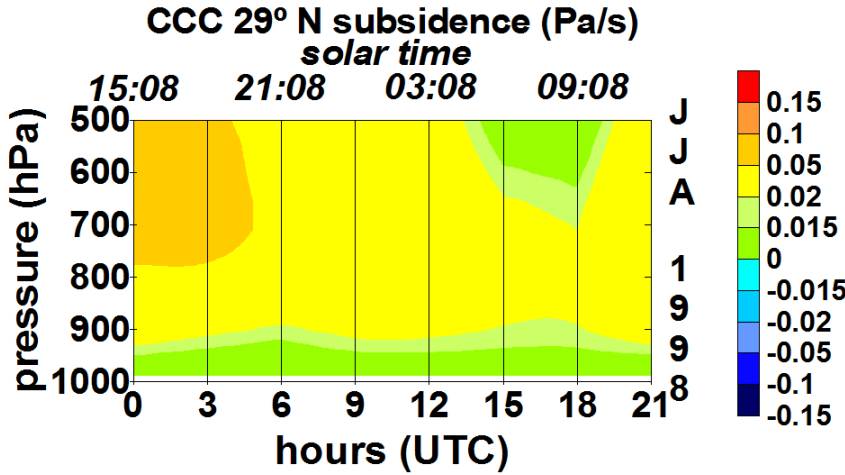
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: subsidence.



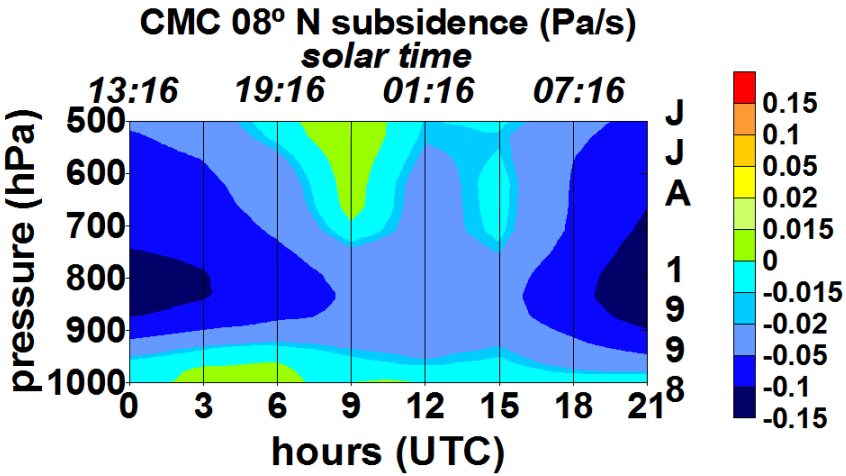


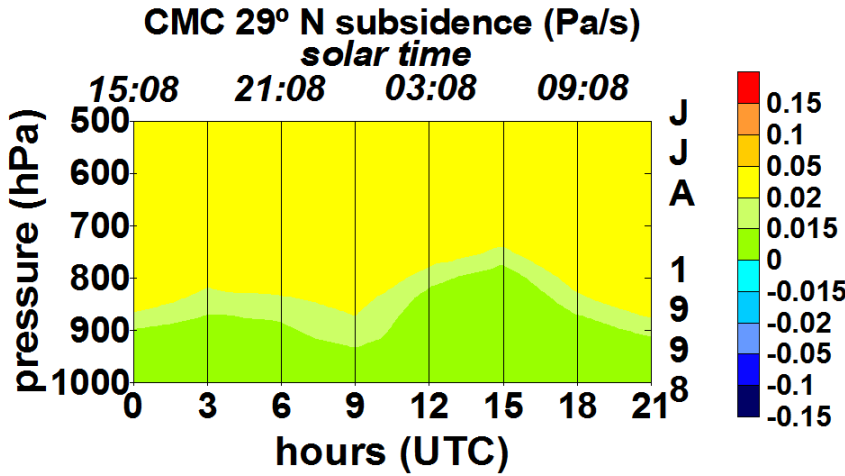


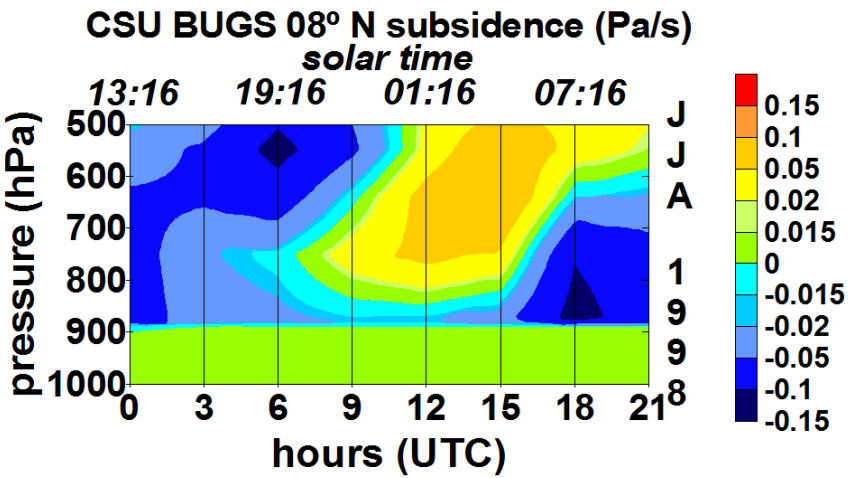


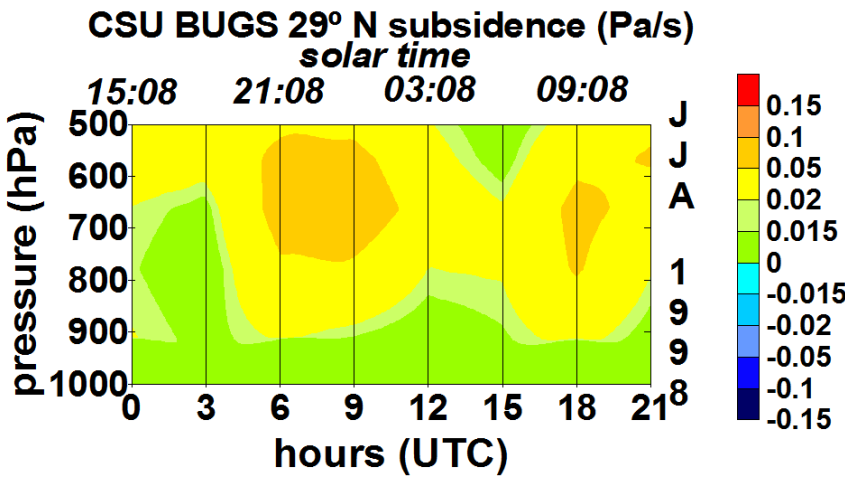
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: subsidence.



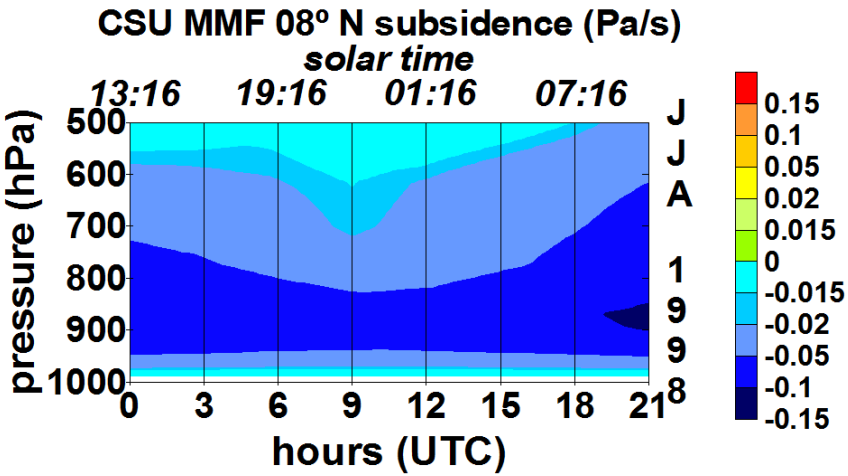


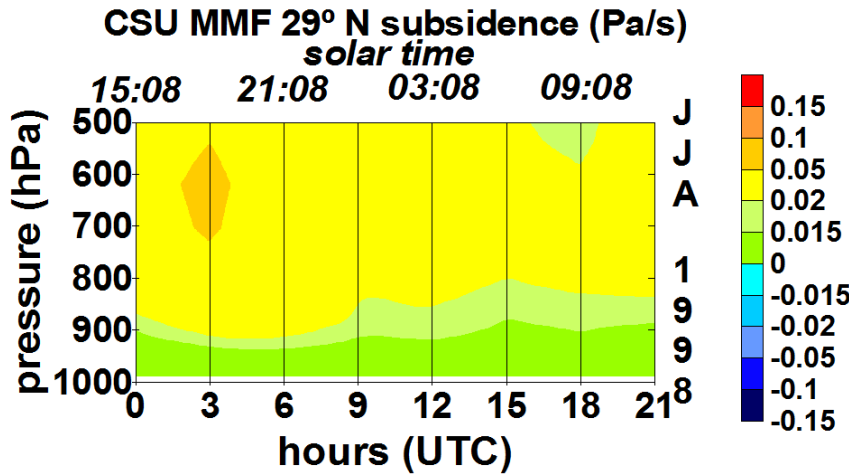


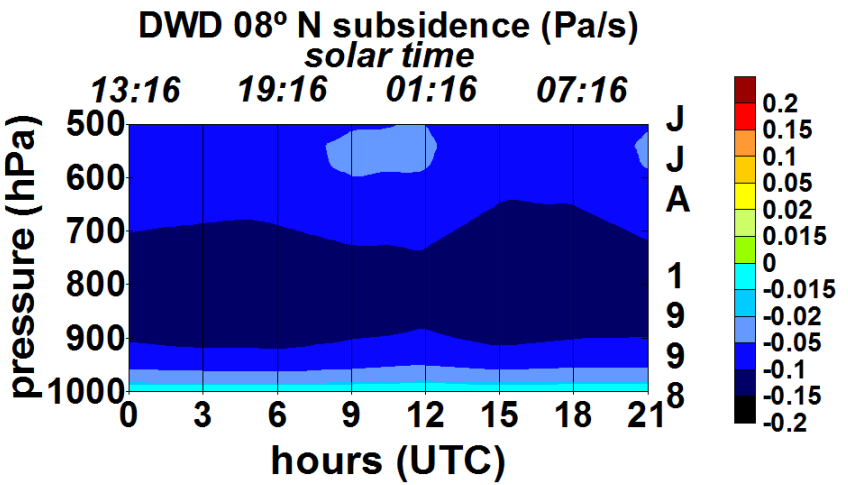


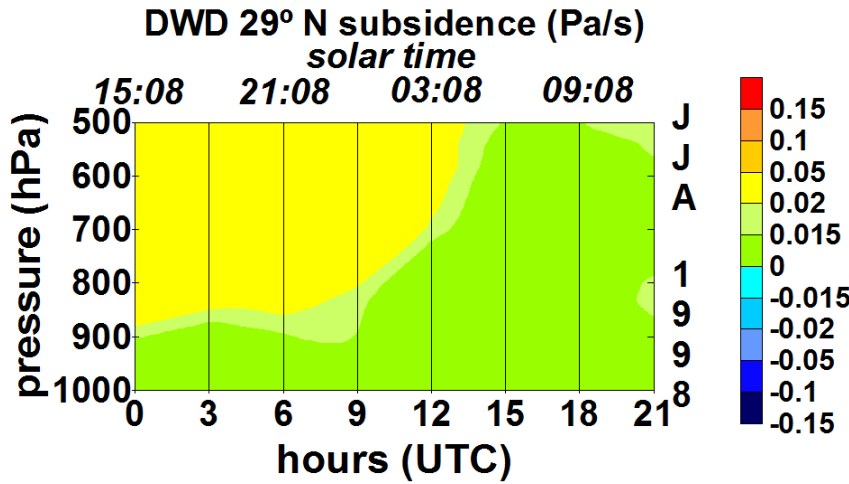
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: subsidence.



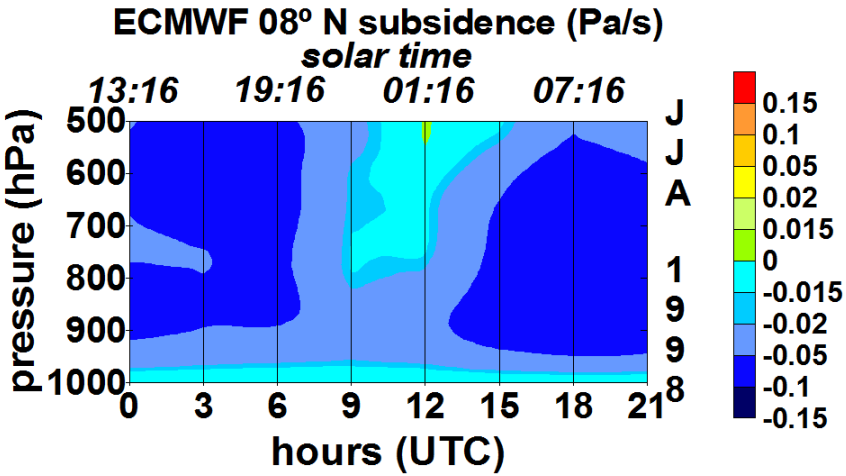


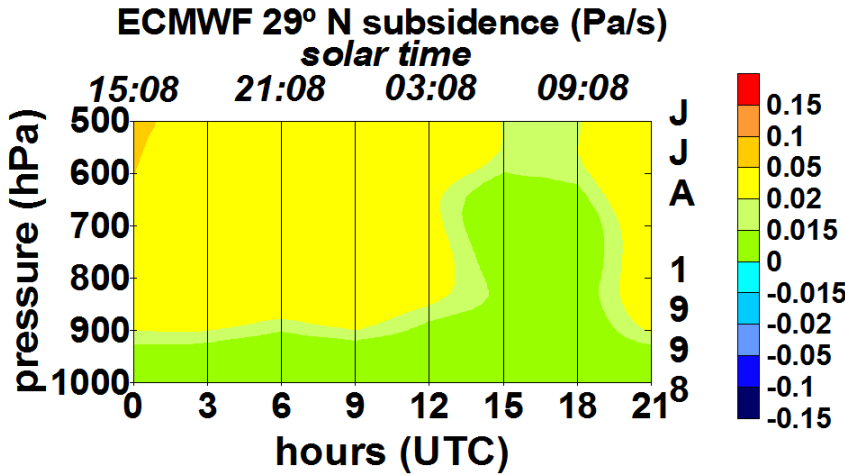


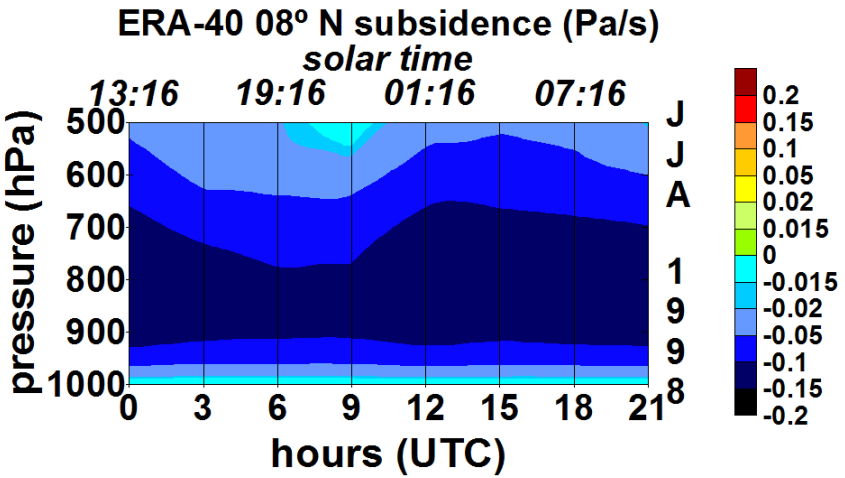


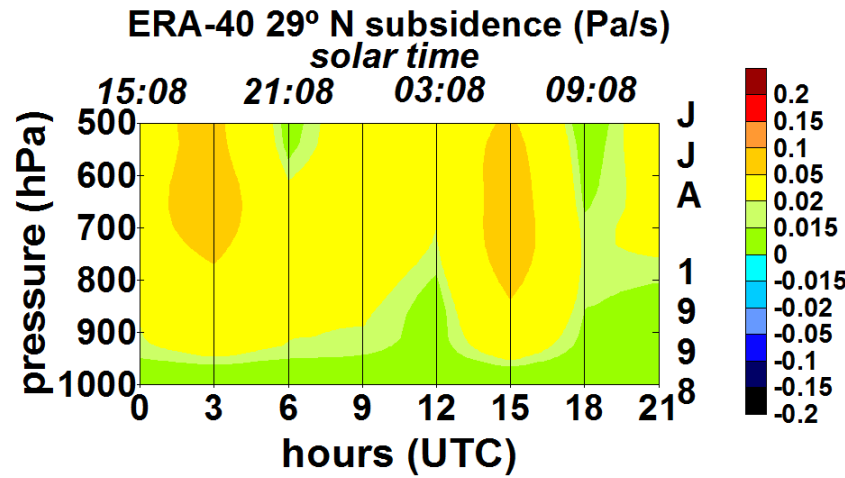
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: subsidence.



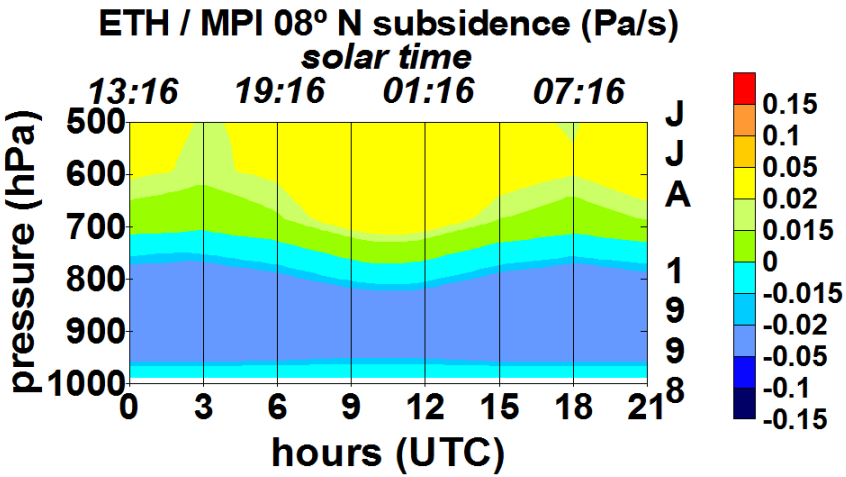


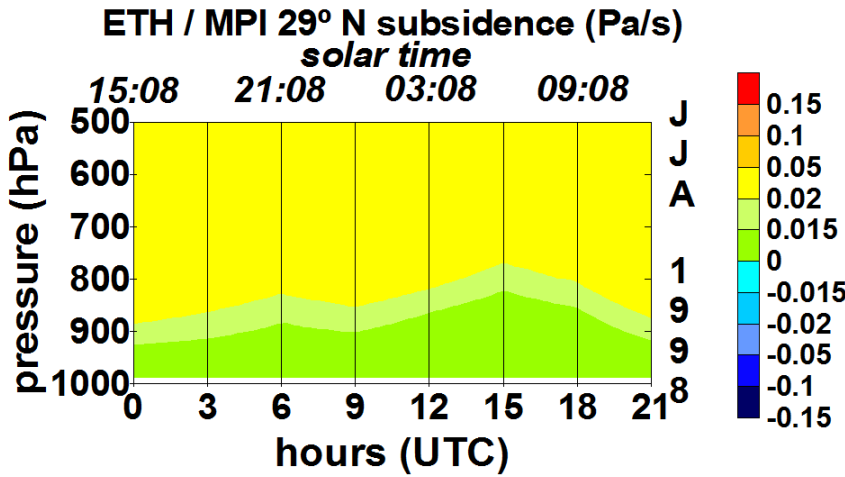


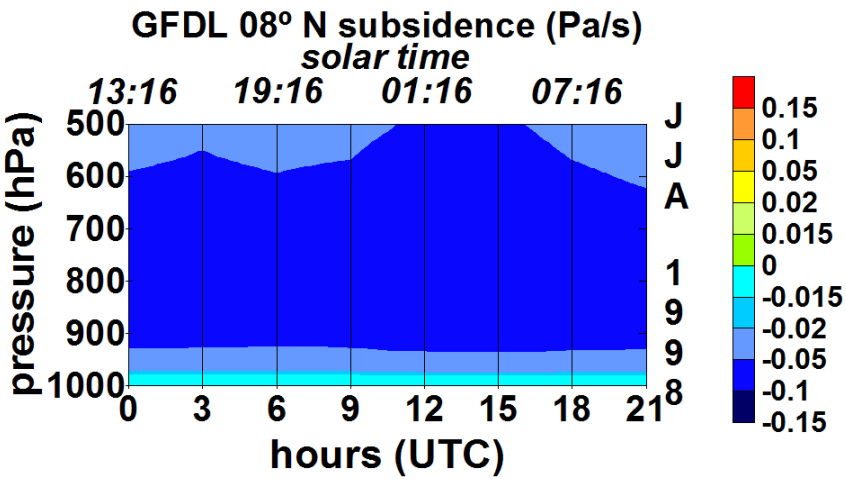


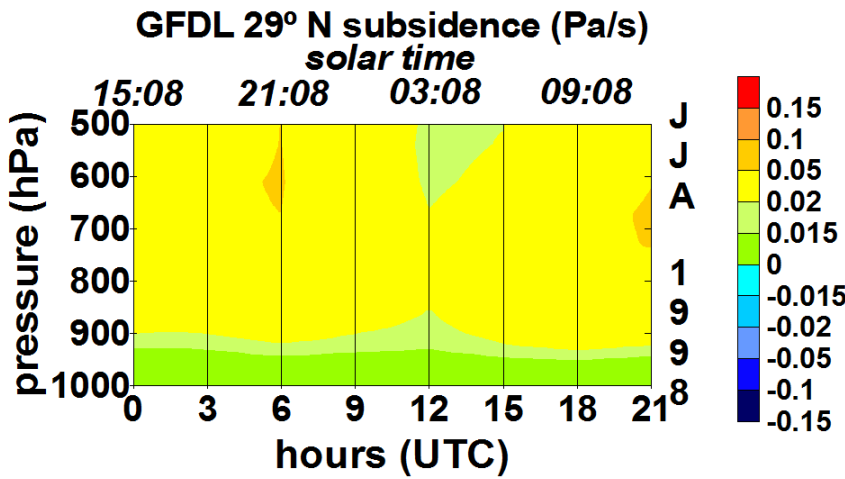
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: subsidence.









GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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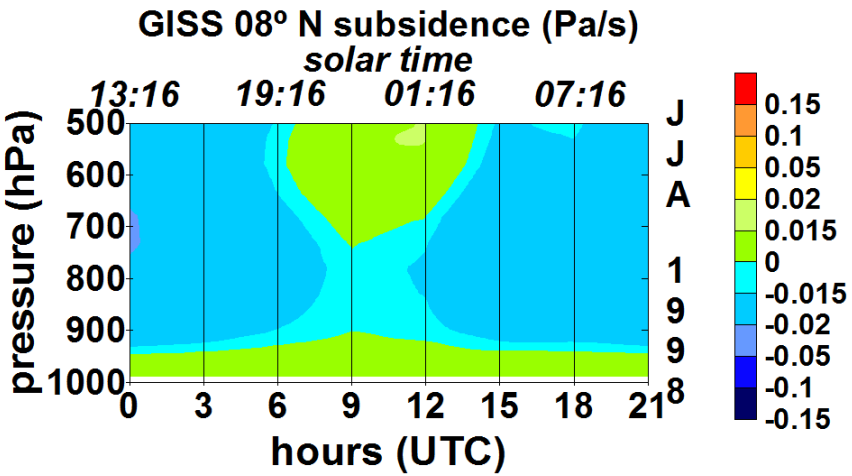
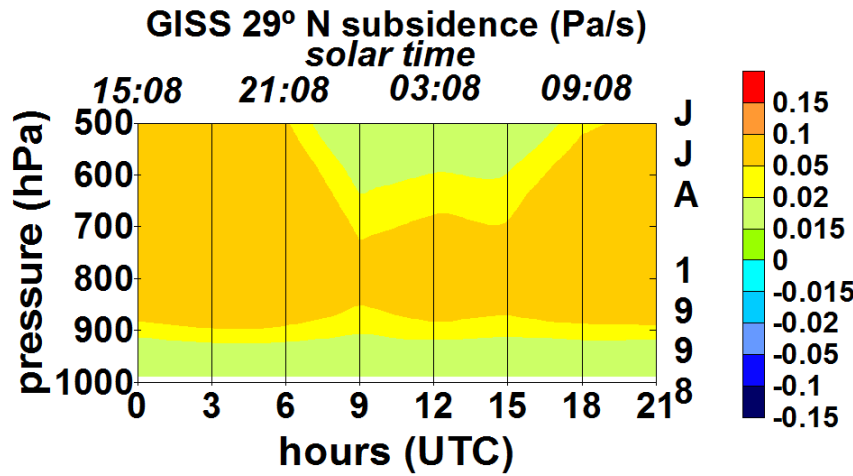
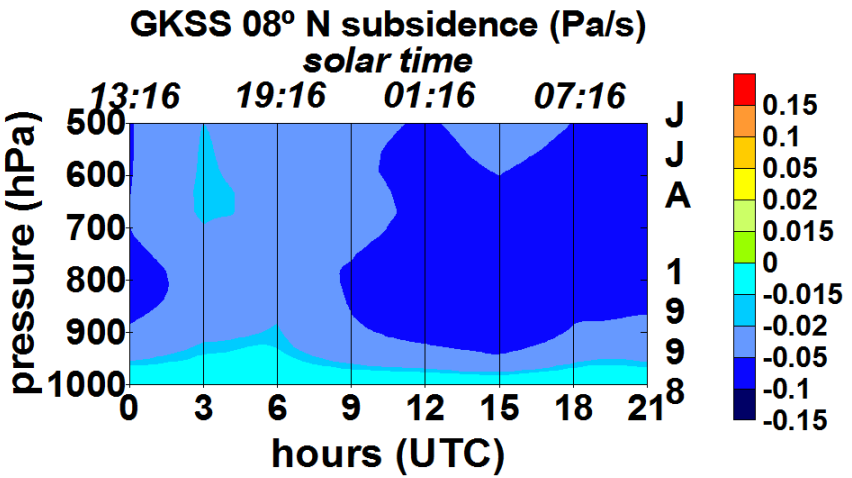
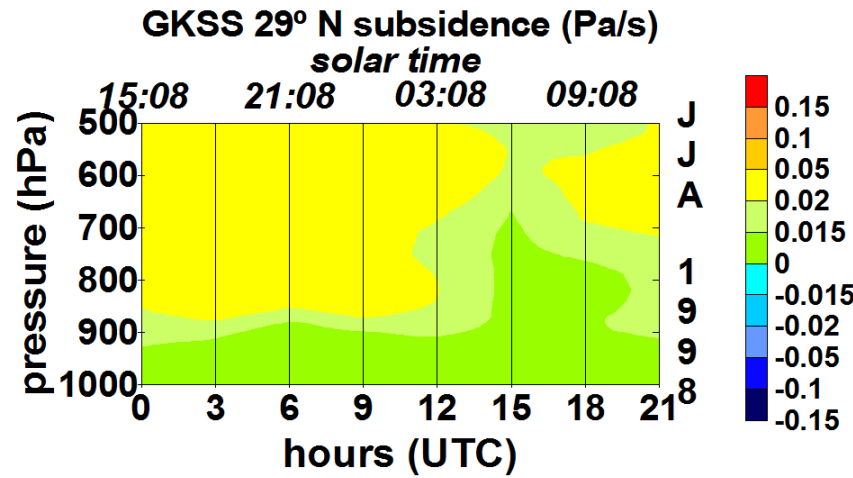


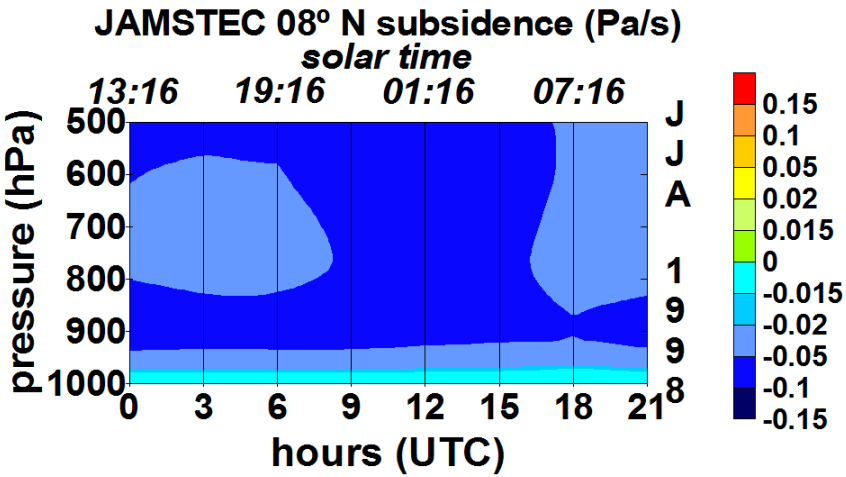


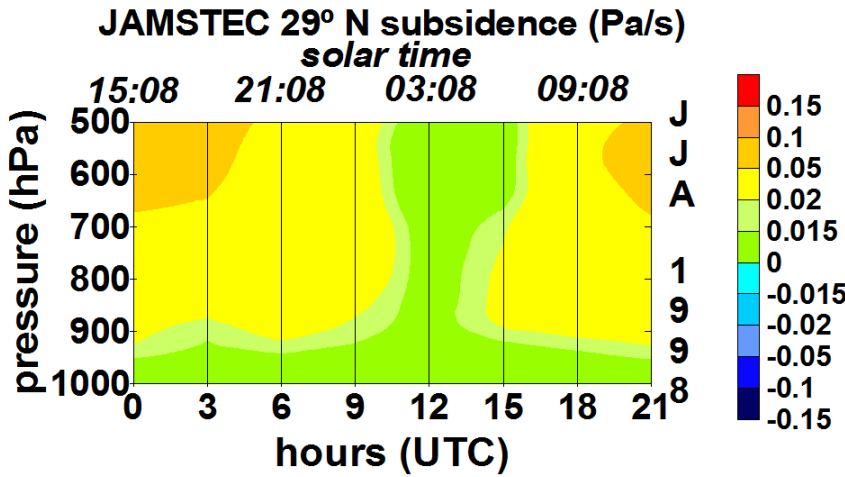


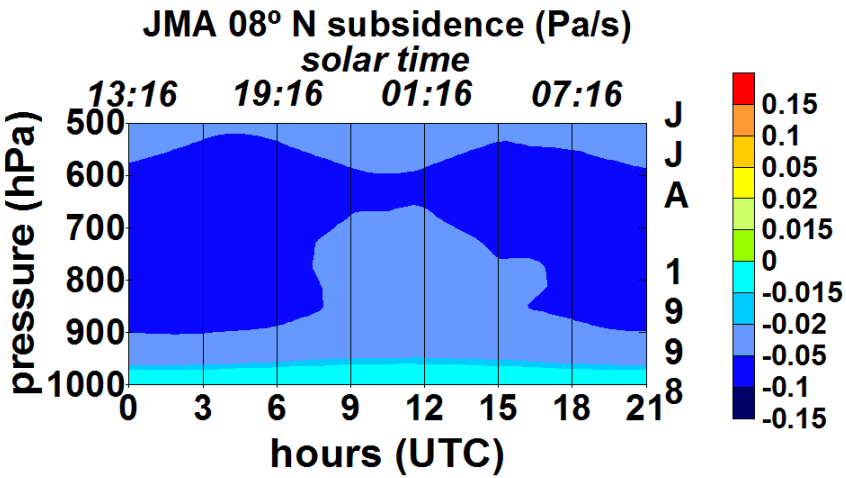


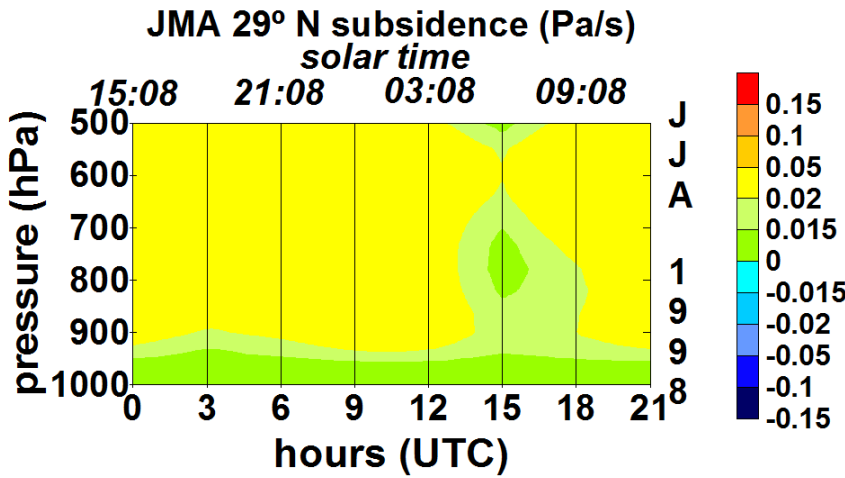
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: subsidence.









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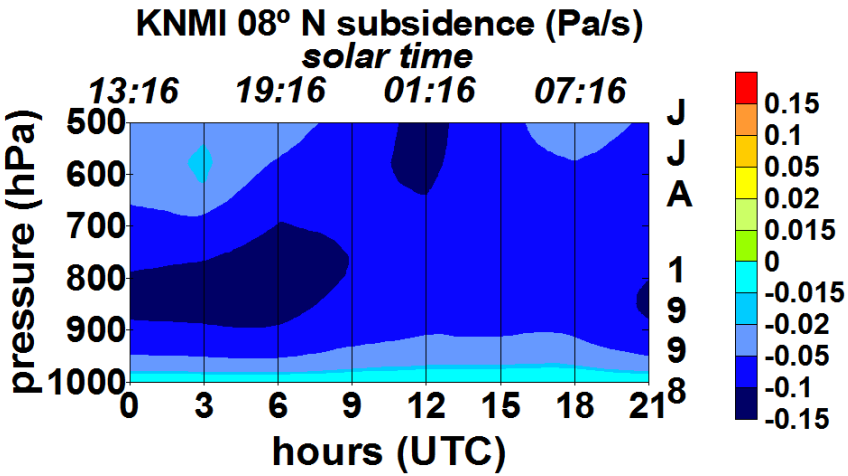
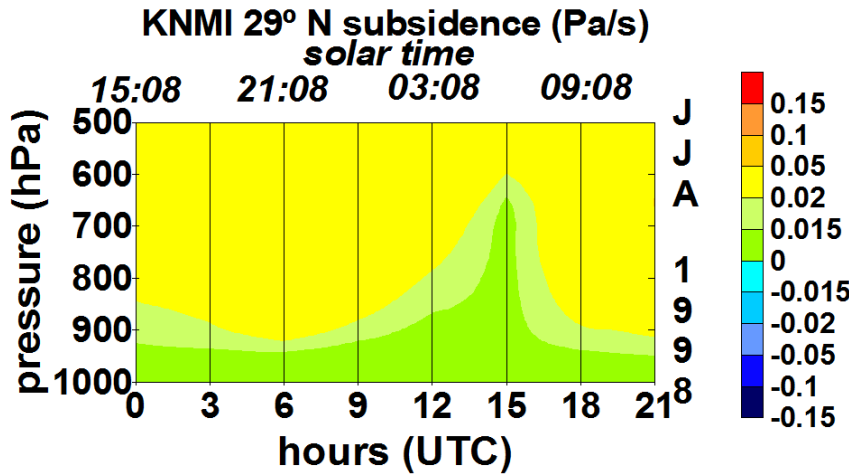
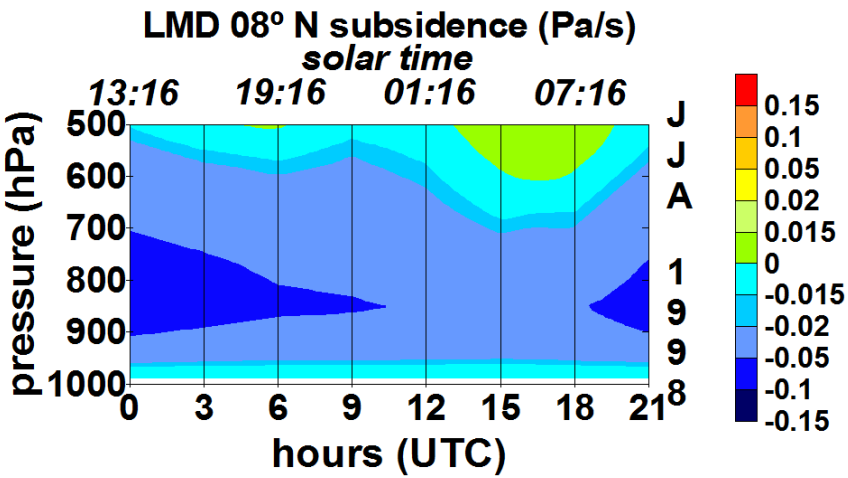
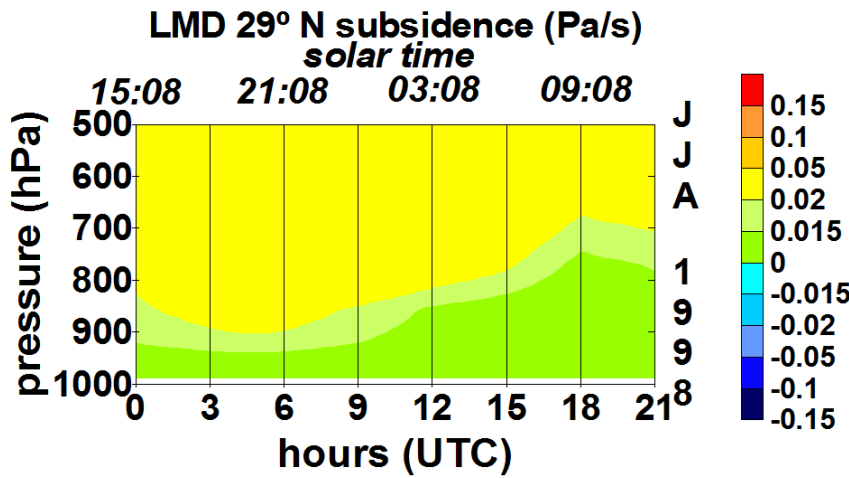
JJA 1998 mean diurnal cycle: subsidence.









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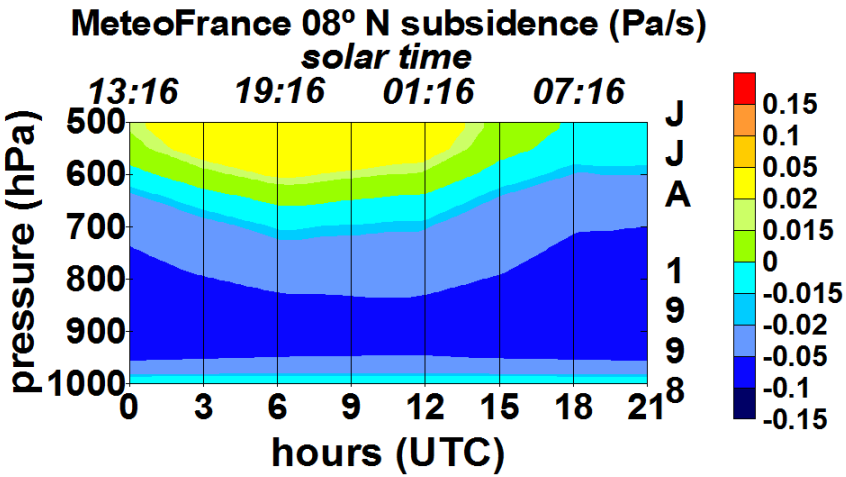

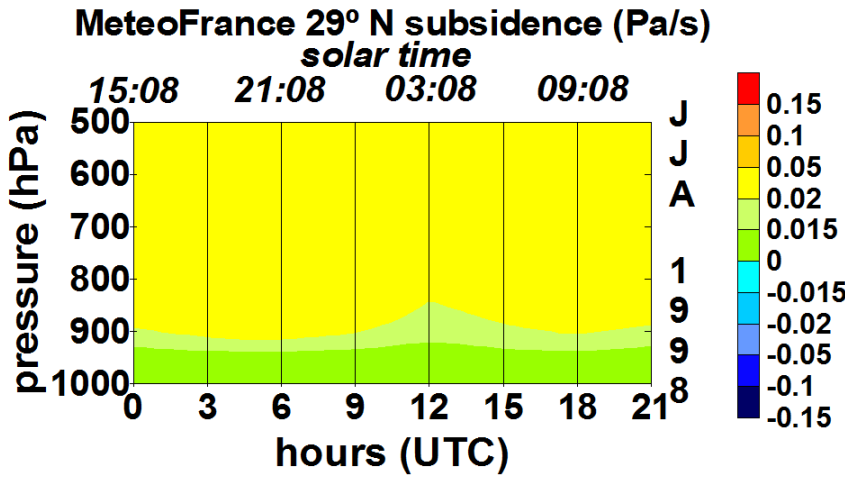

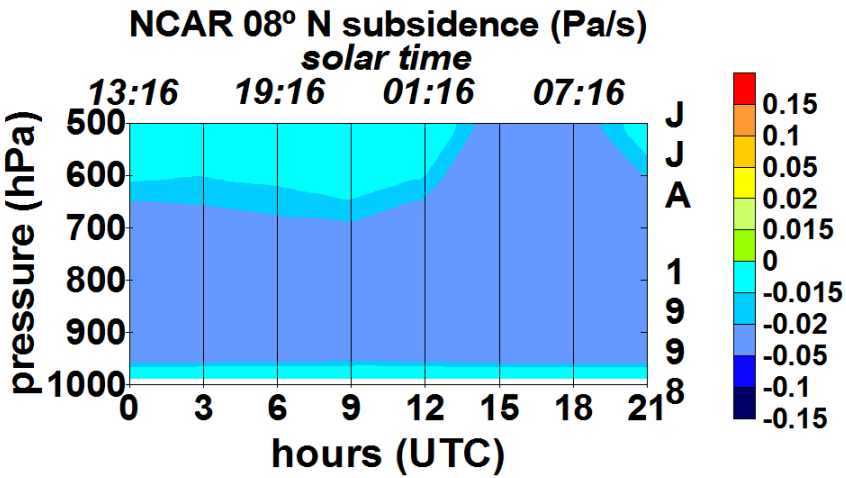

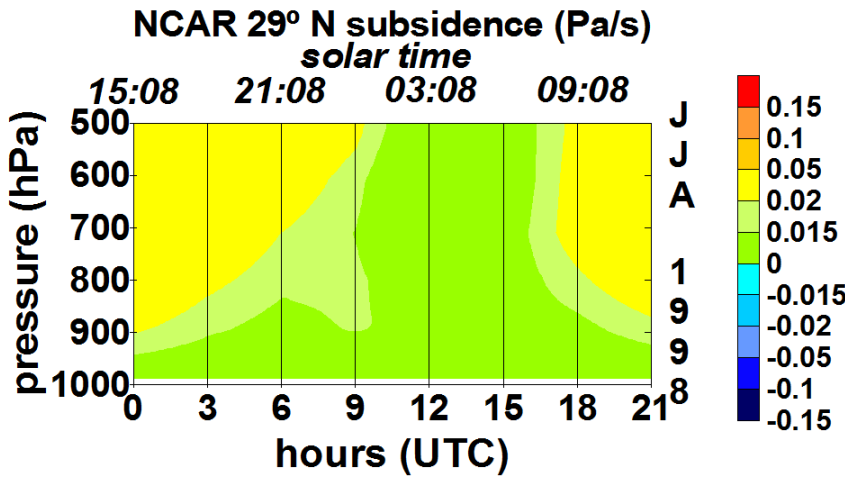

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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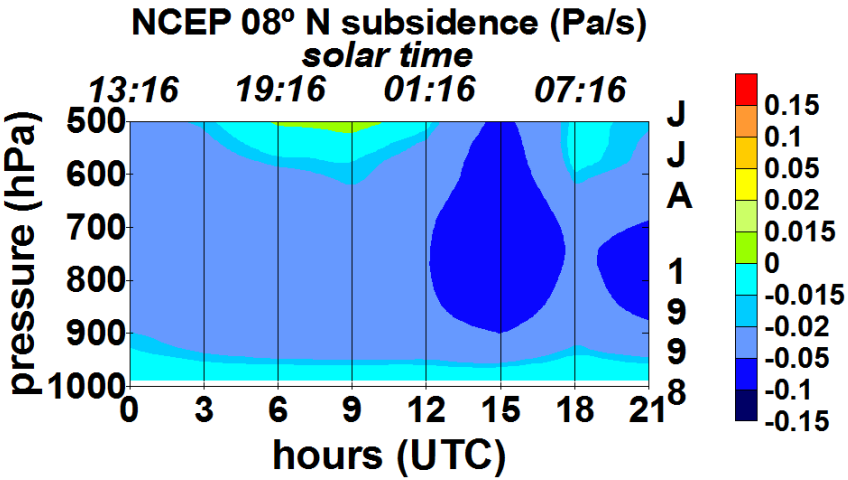
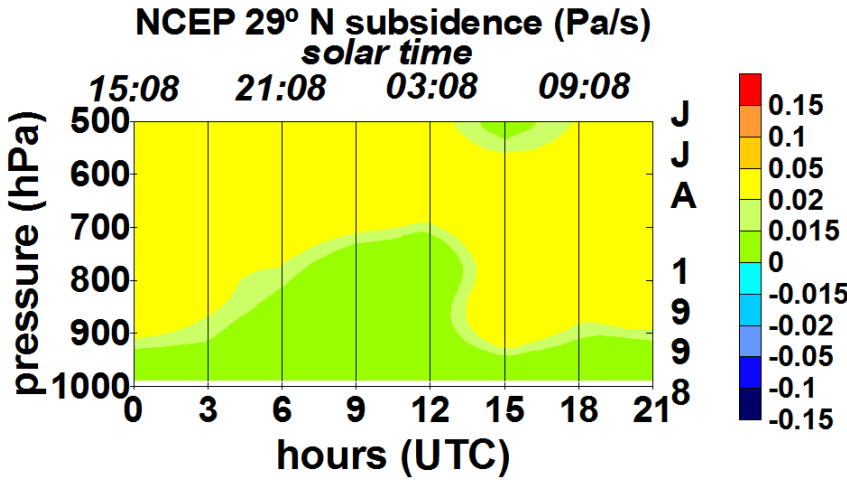
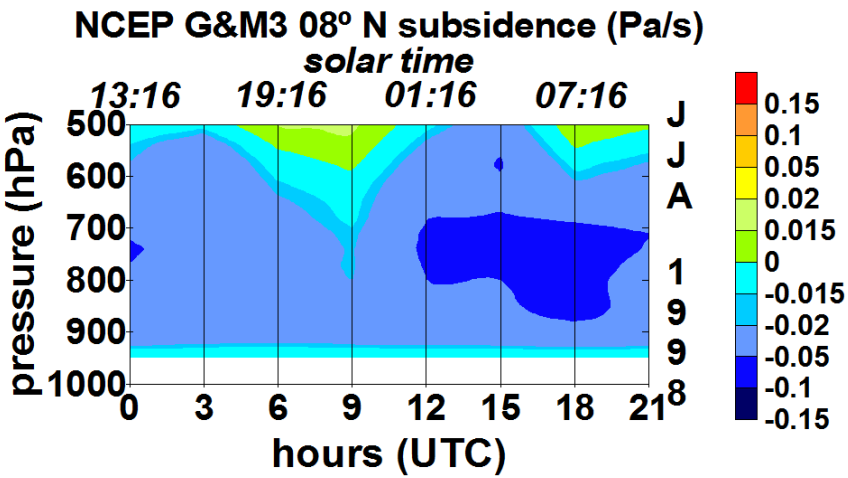
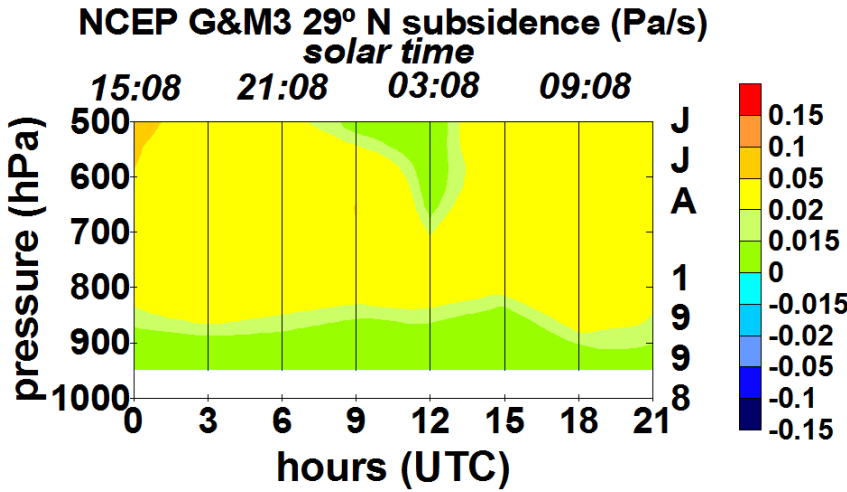


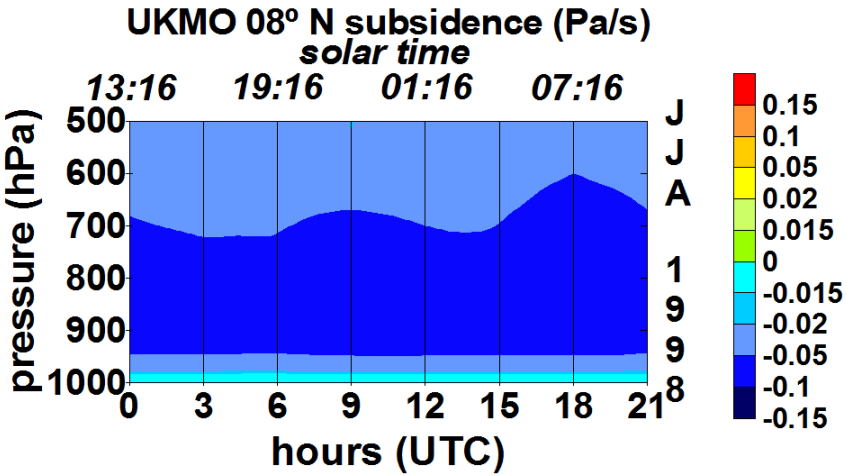


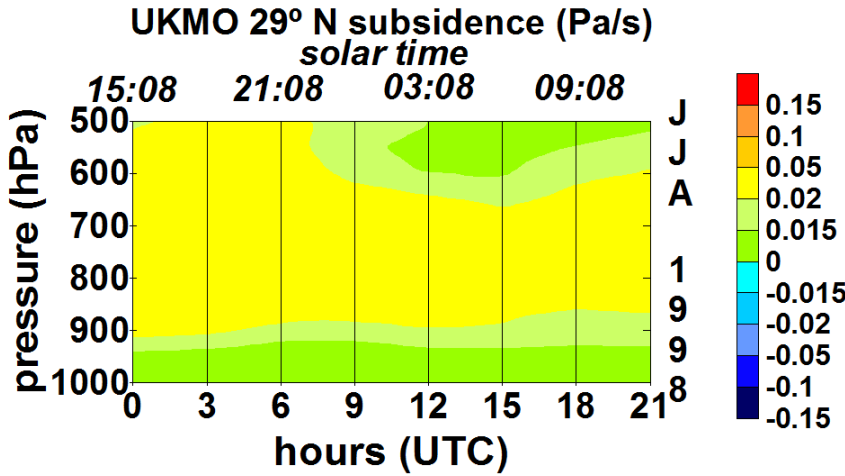


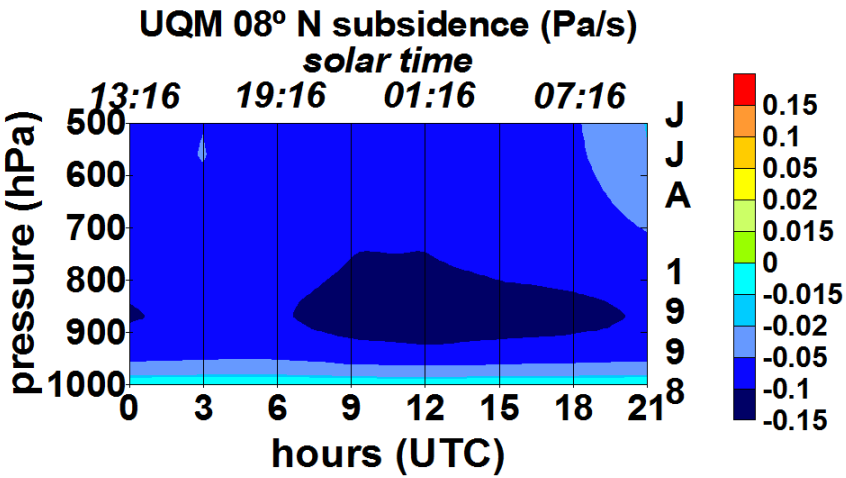


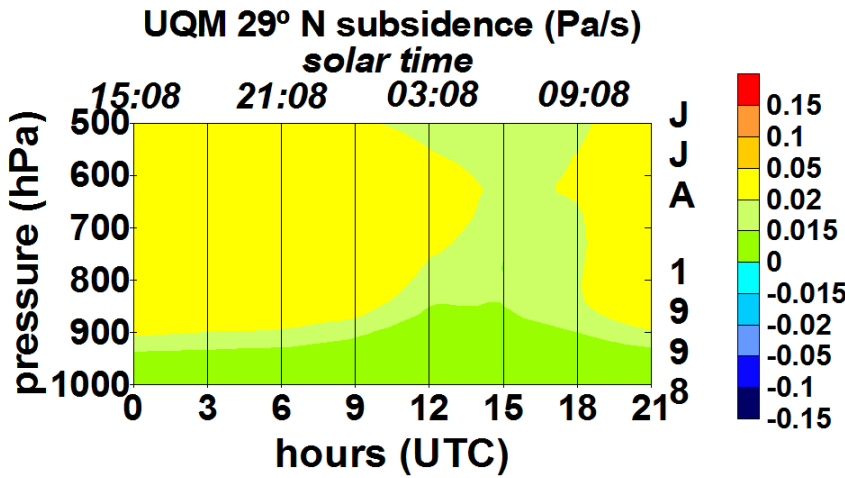
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: subsidence.



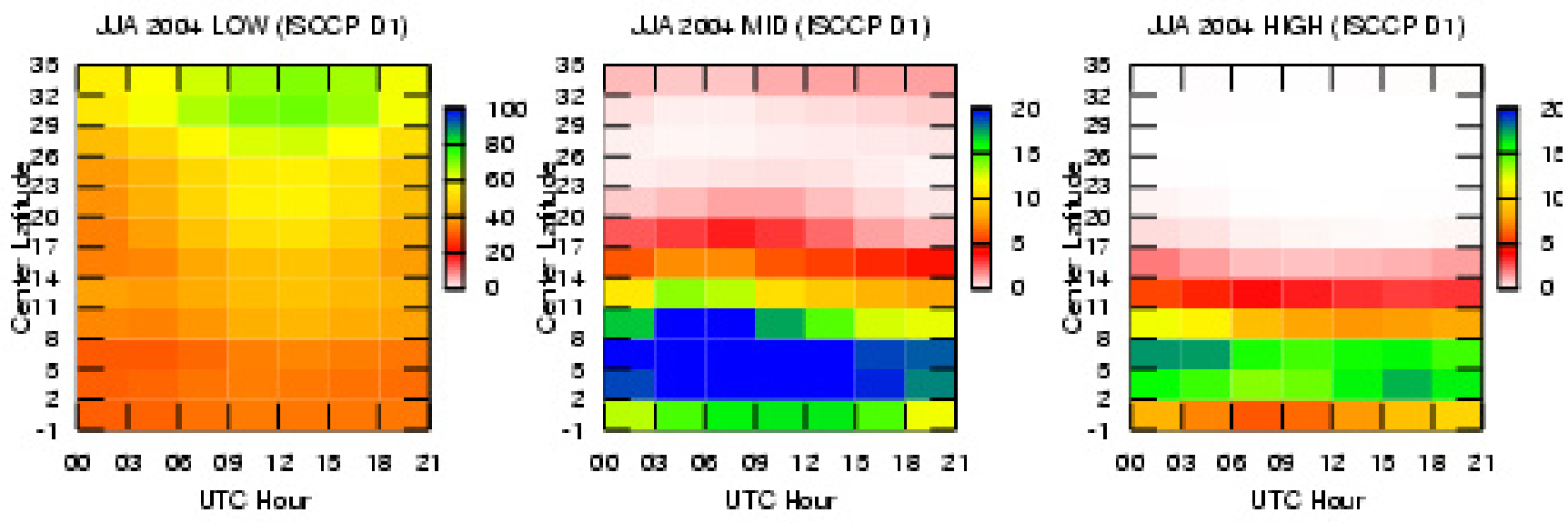






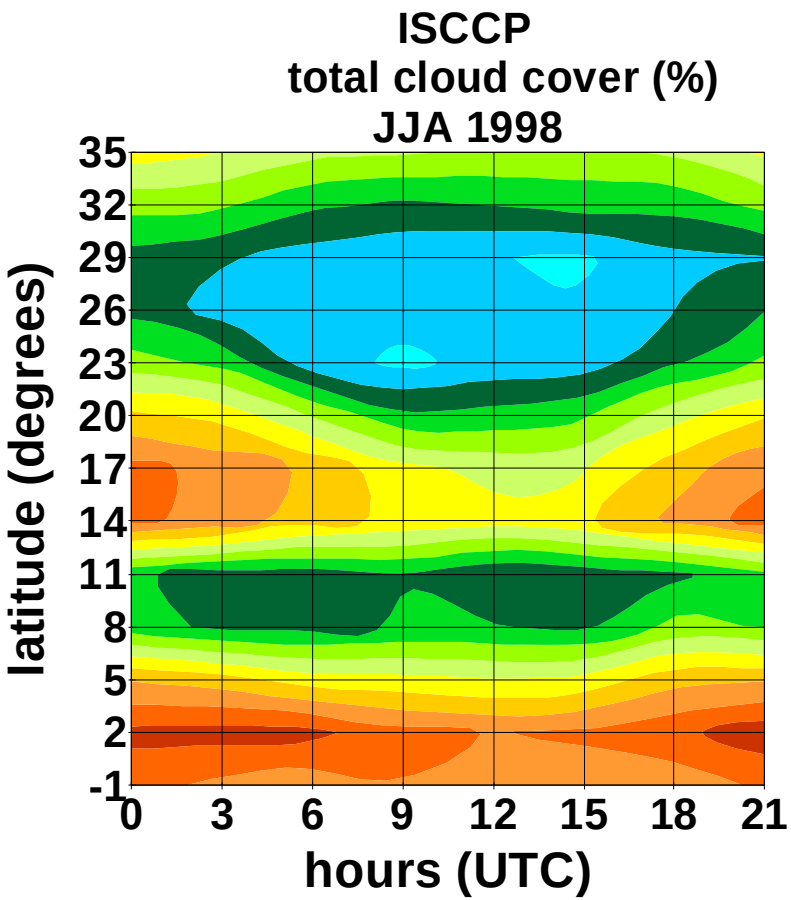
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

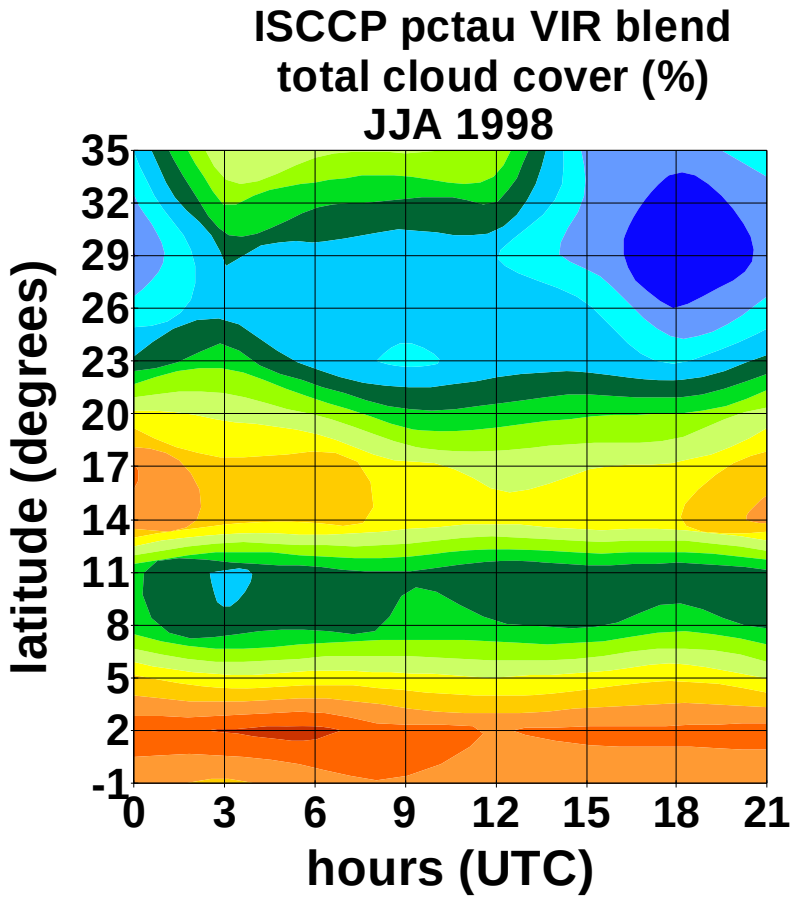
JJA 1998 mean diurnal cycle: total cloud cover.



GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: total cloud cover.

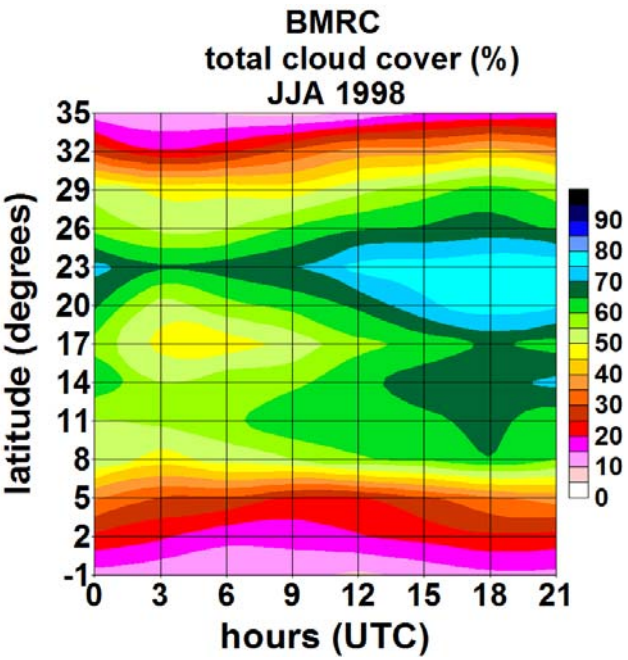


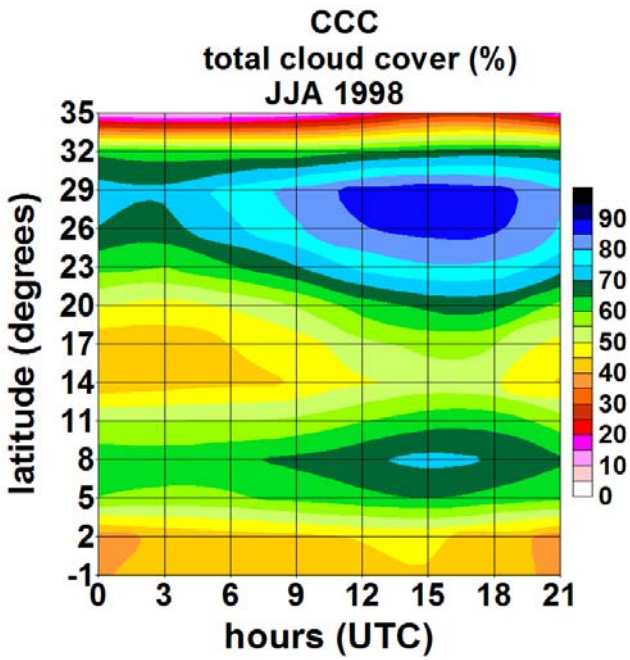


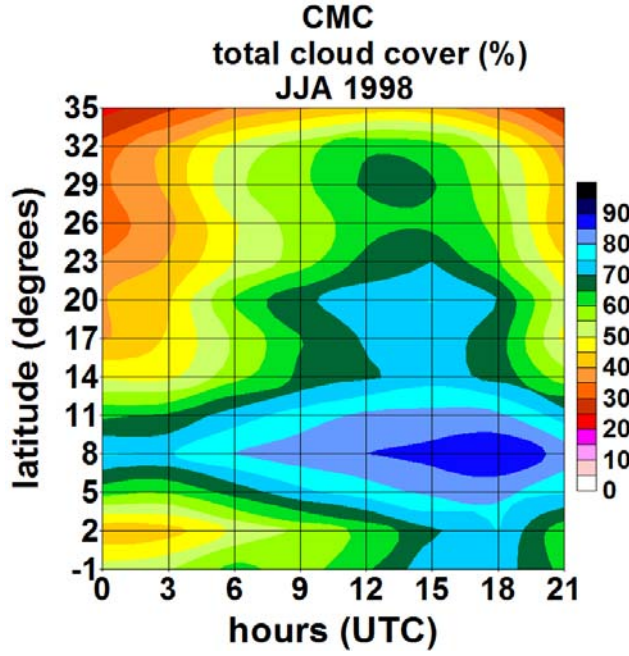
OBS: the plot to the left corresponds to **pctau-IR-only** (**VIR**=VIS&IR blended).

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: total cloud cover.

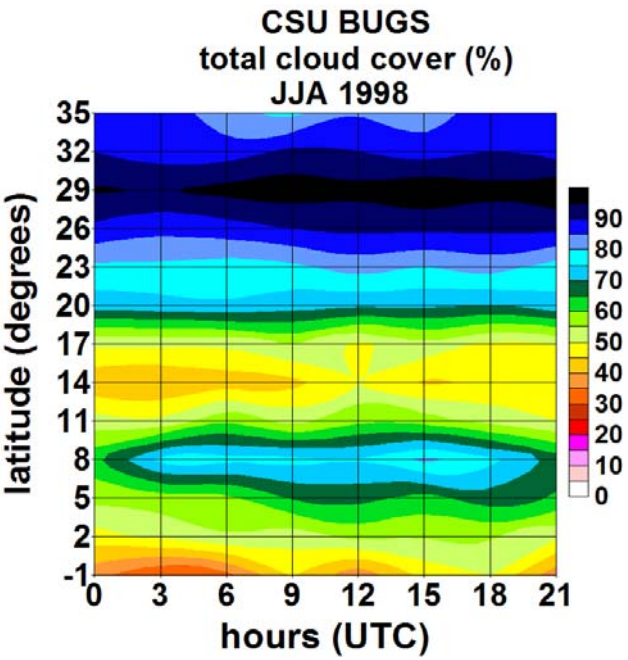


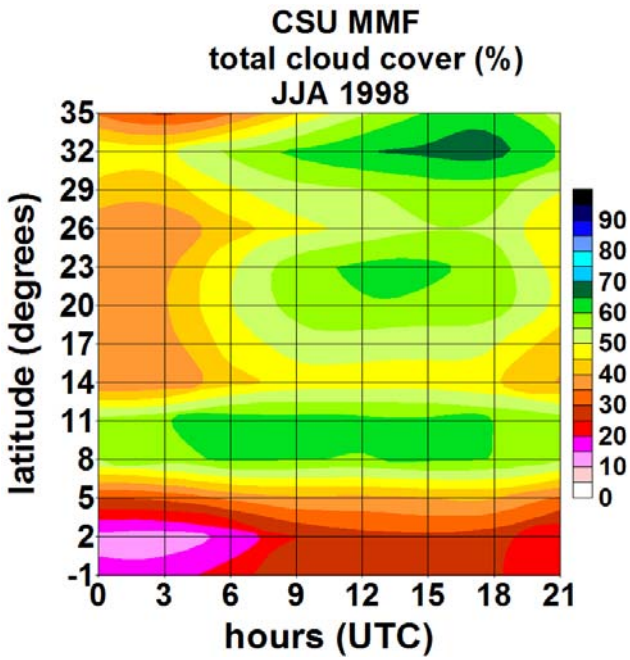


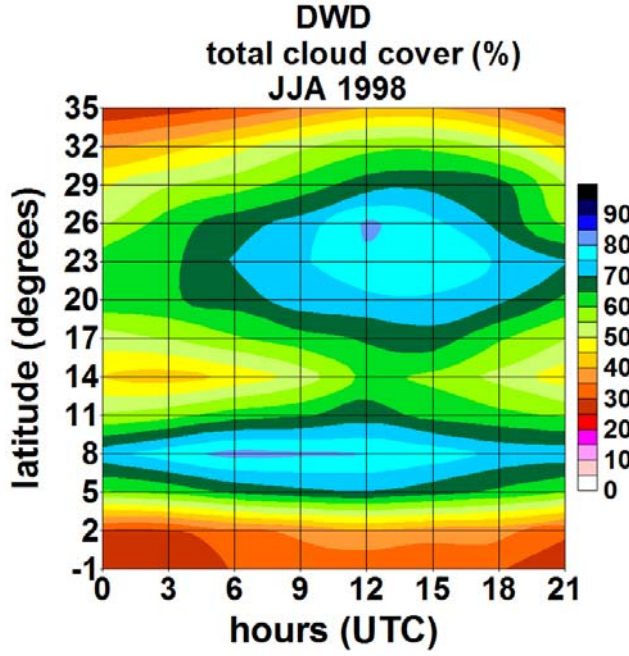


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: total cloud cover.

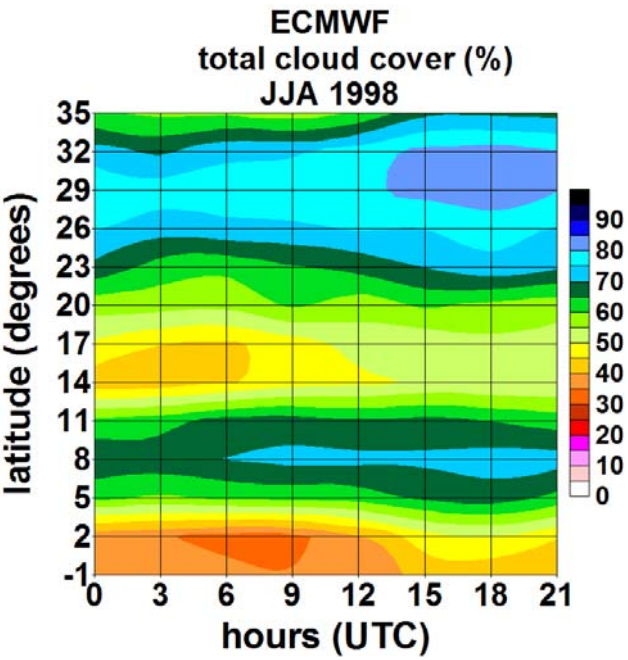


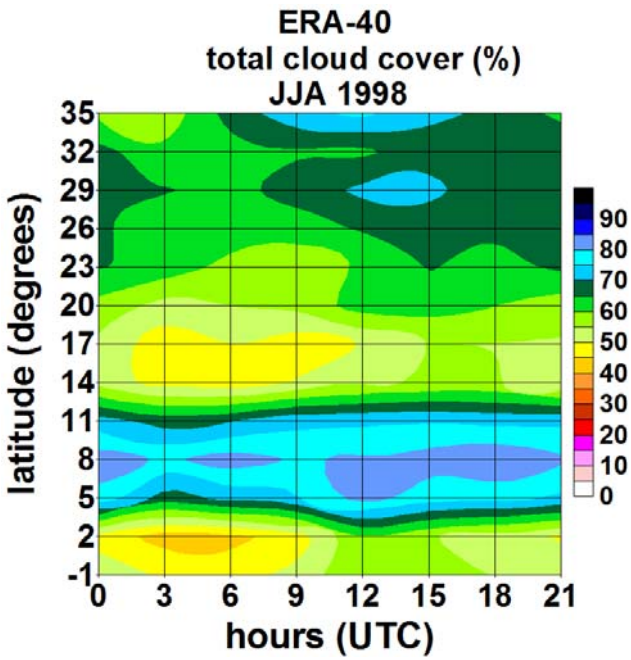


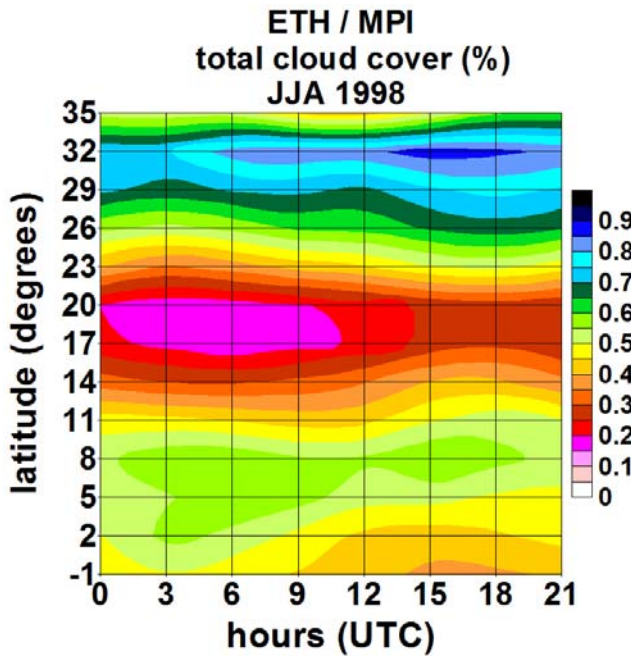


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: total cloud cover.

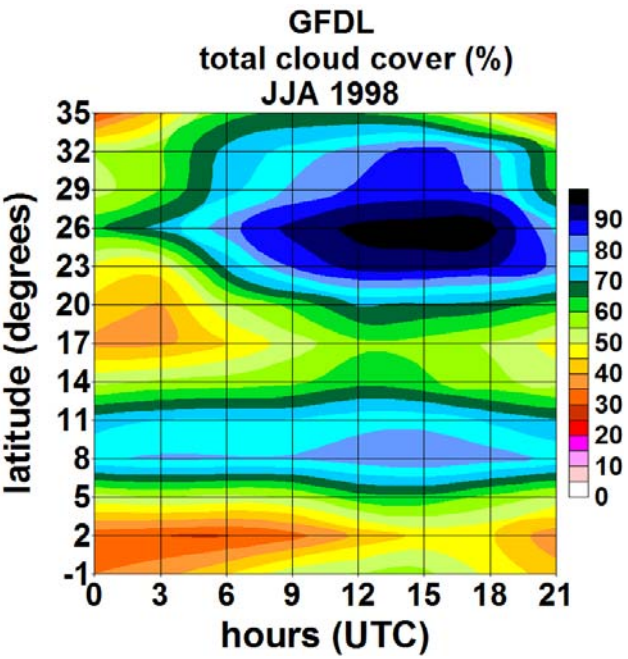


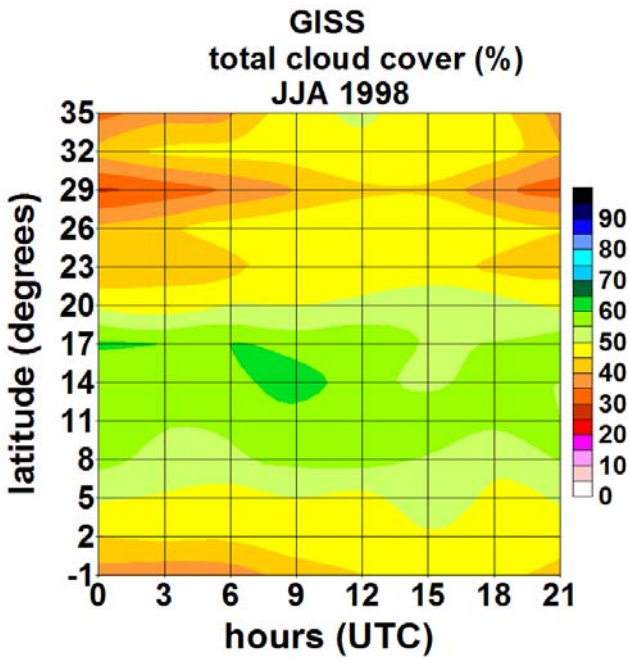


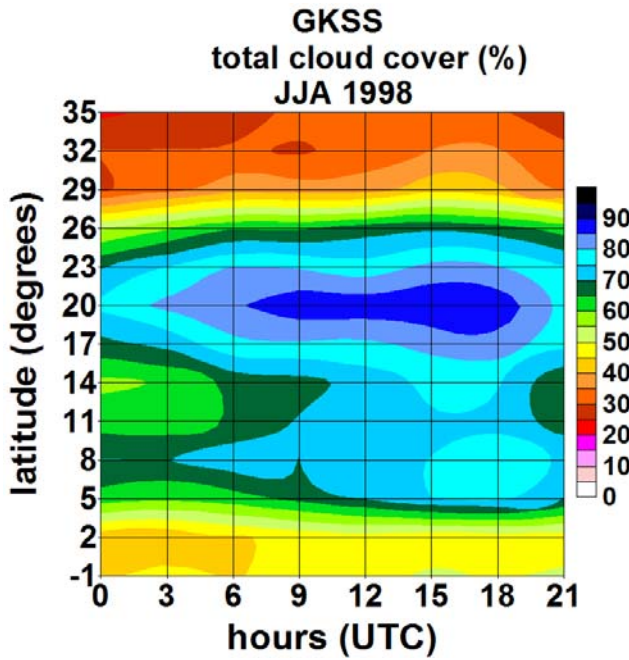


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: total cloud cover.

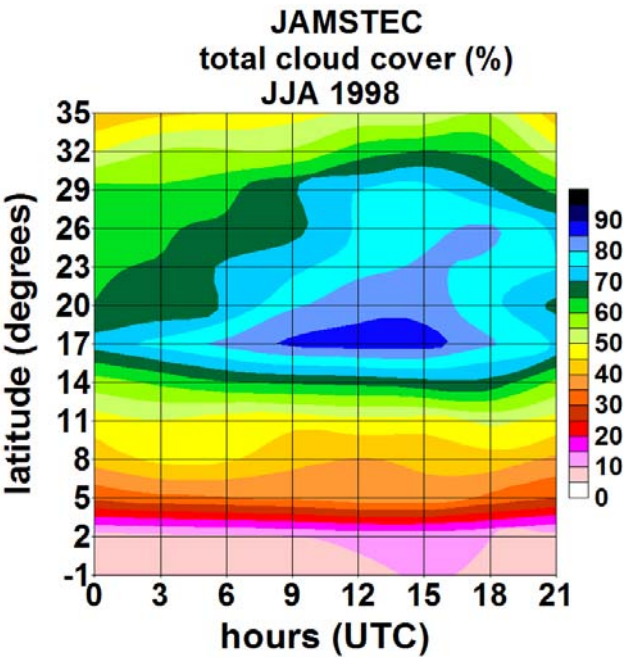


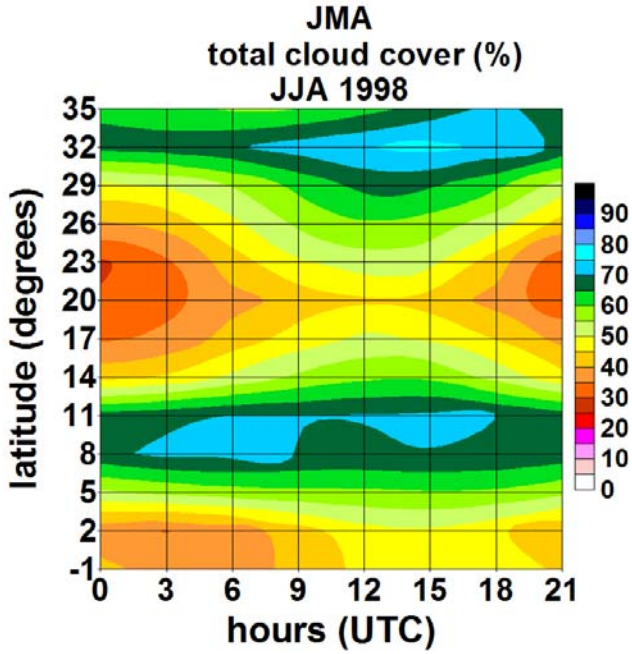


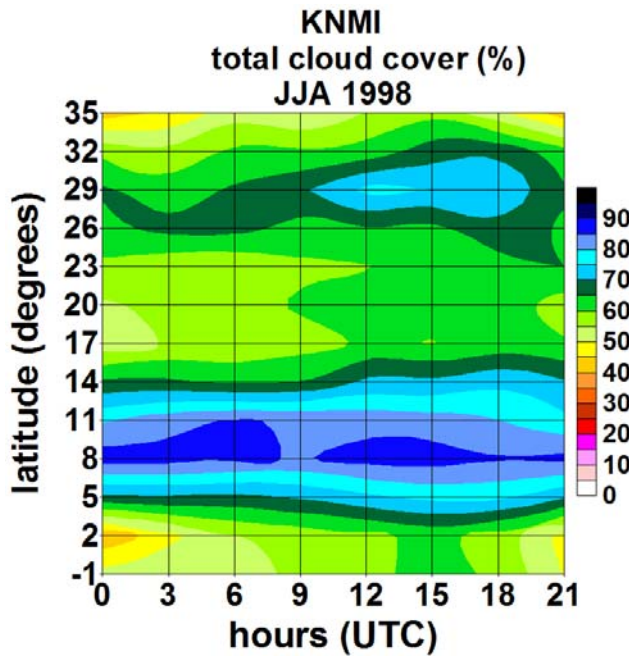


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: total cloud cover.

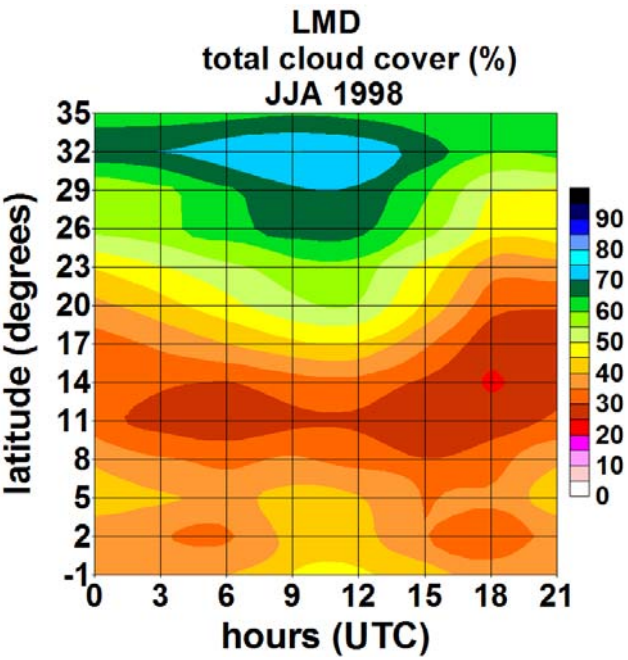


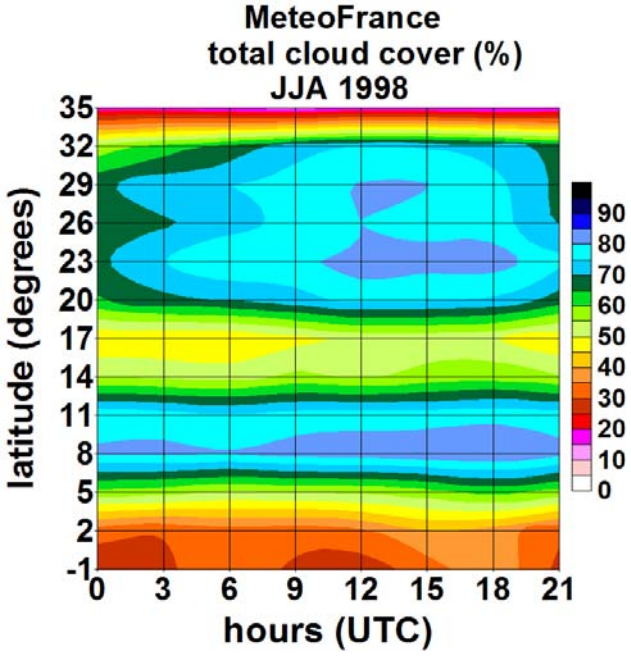


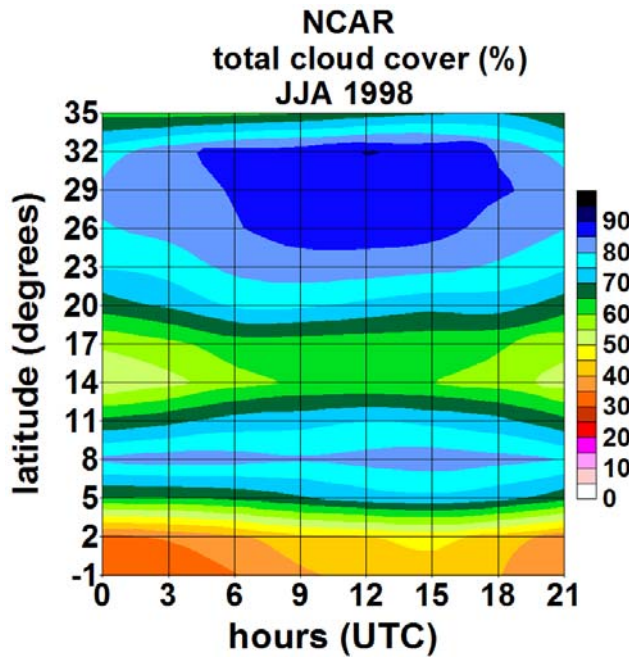


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: total cloud cover.

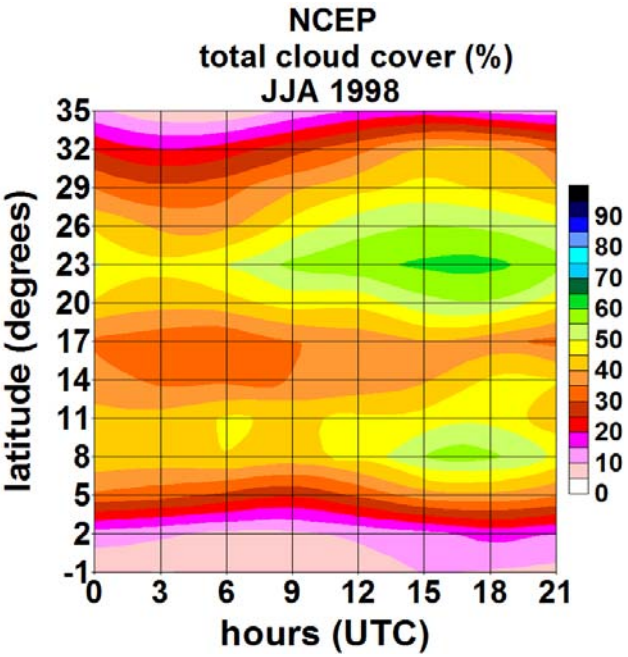


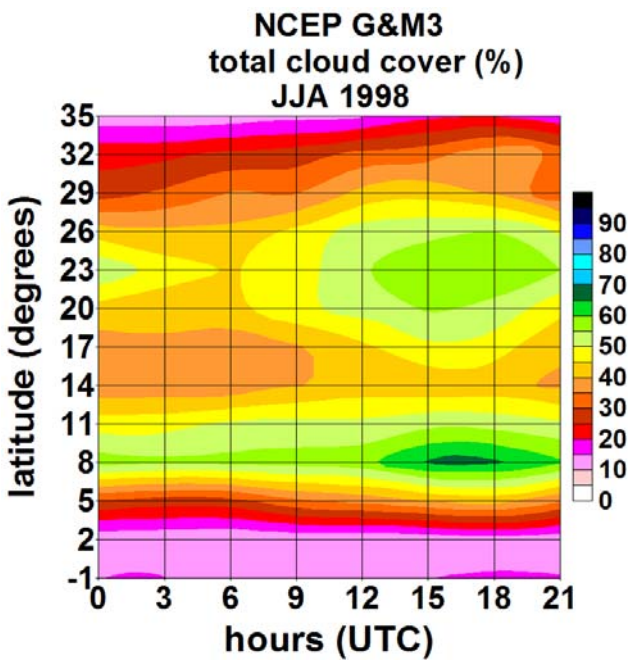


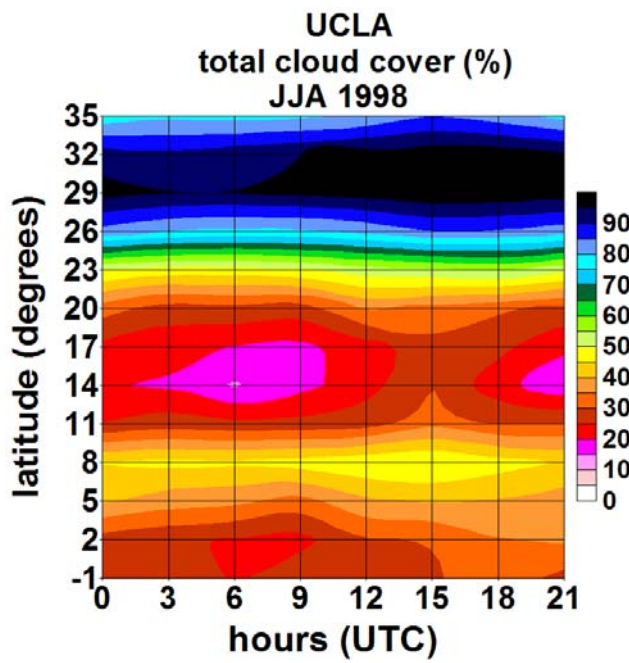


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: total cloud cover.

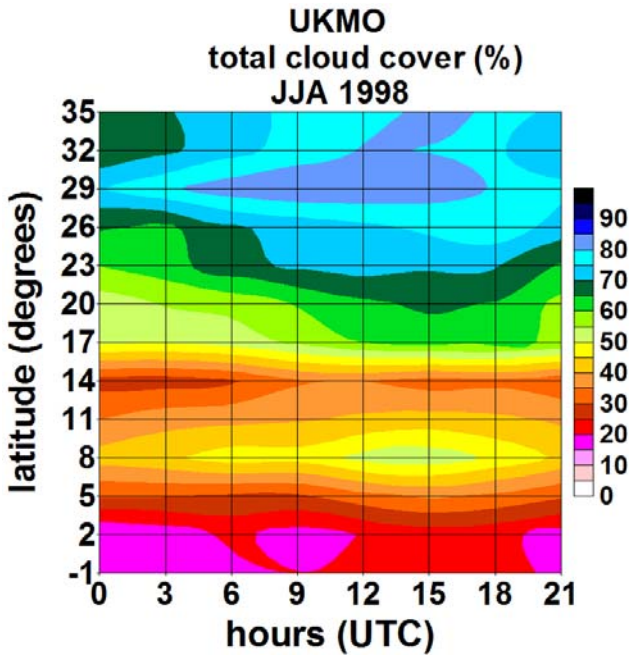


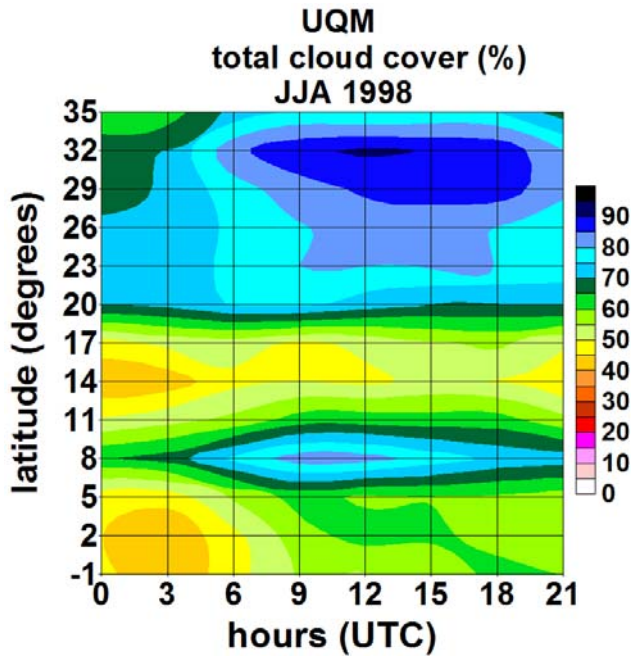




GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

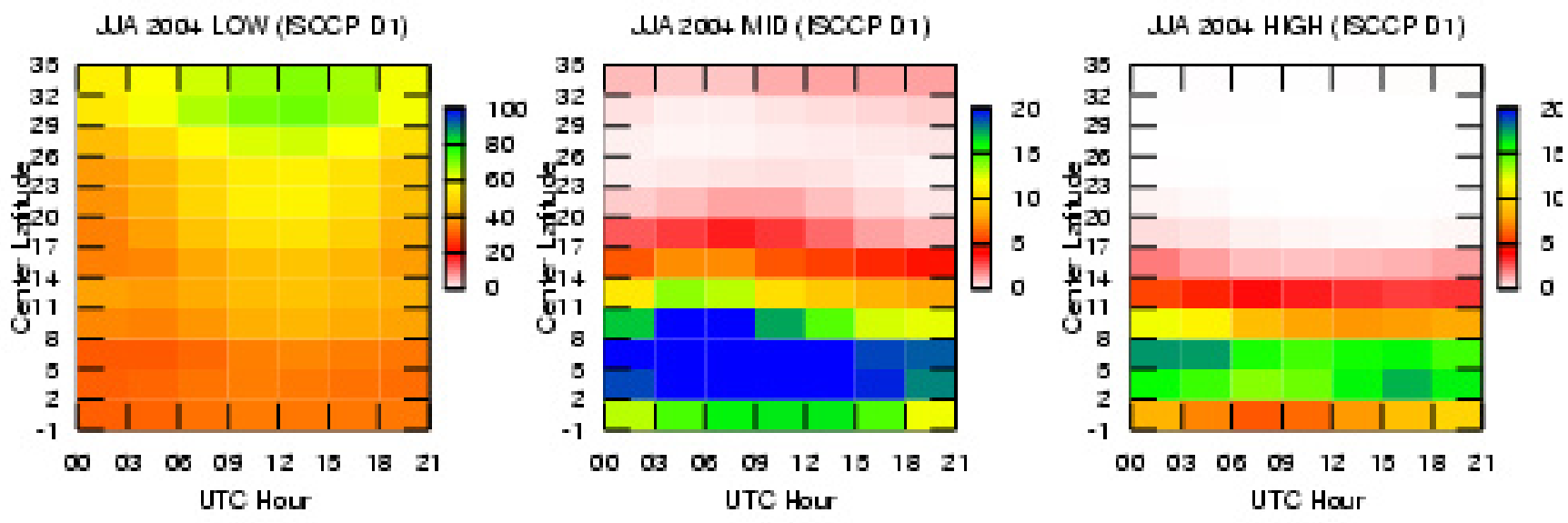
JJA 1998 mean diurnal cycle: total cloud cover.





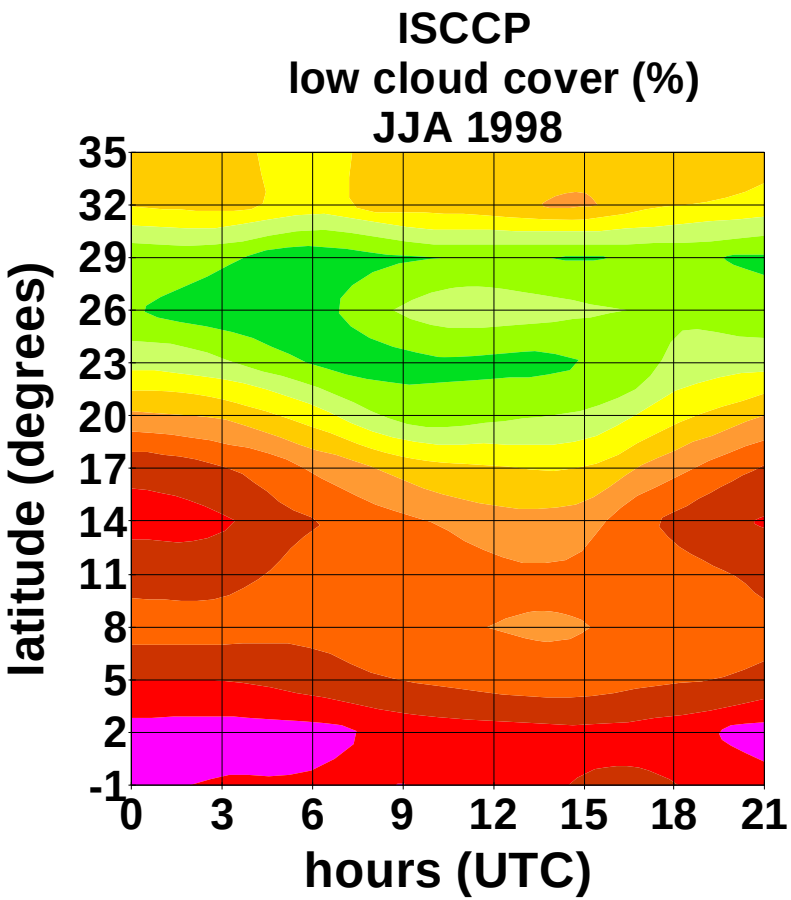
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

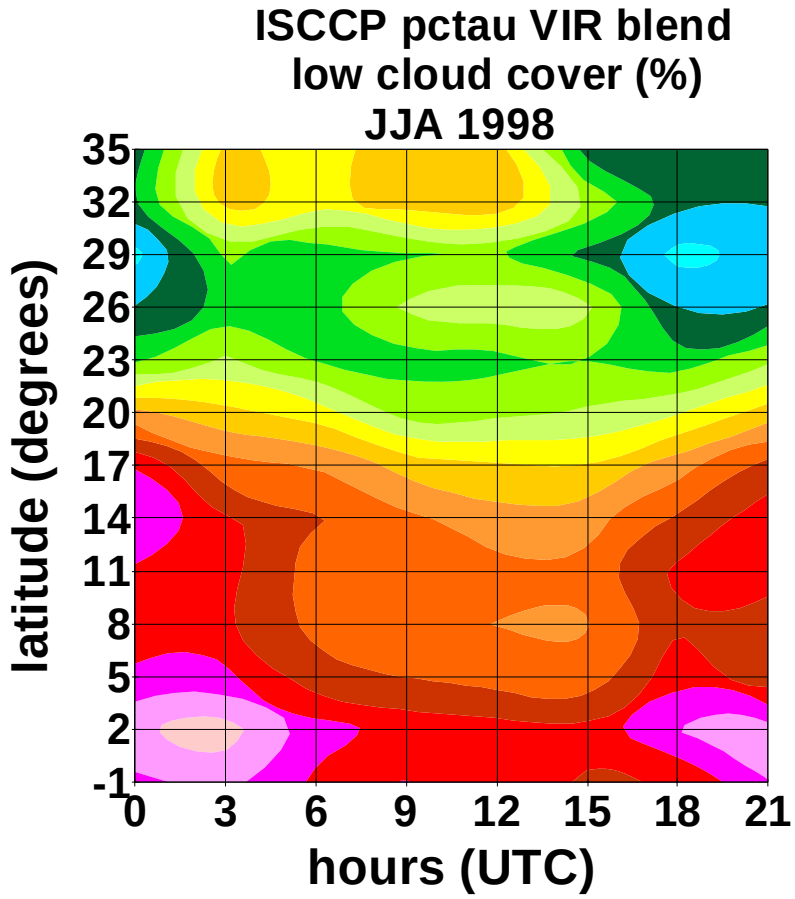
JJA 1998 mean diurnal cycle: low cloud cover.



GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: low cloud cover.

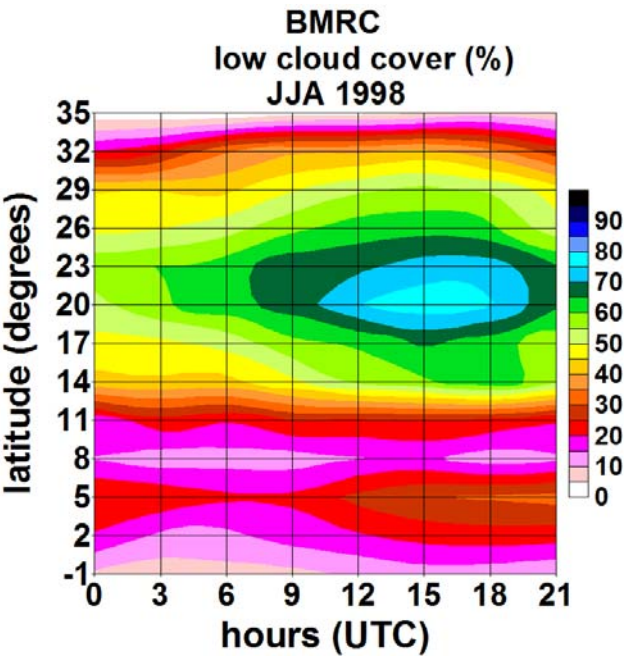


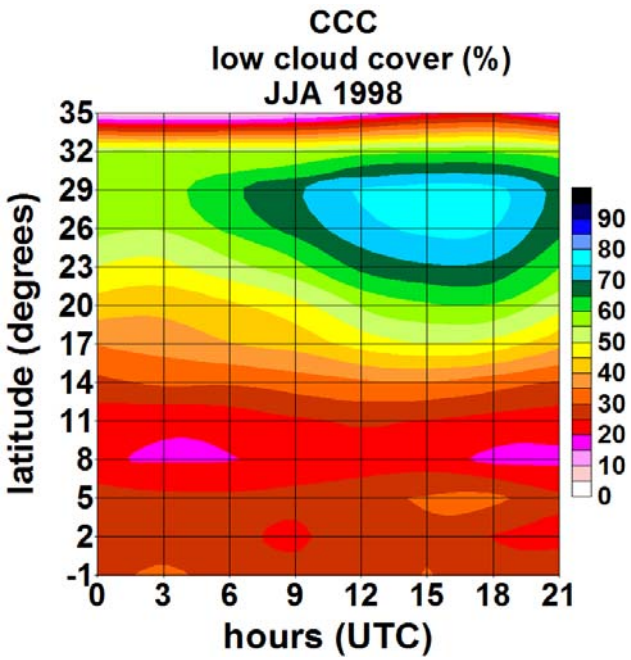


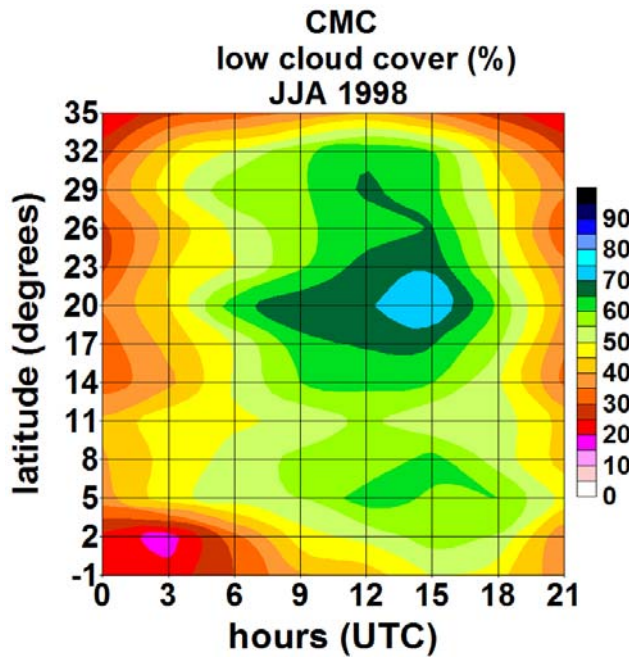
OBS: the plot to the left corresponds to **pctau-IR-only** (**VIR**=VIS&IR blended).

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: low cloud cover.

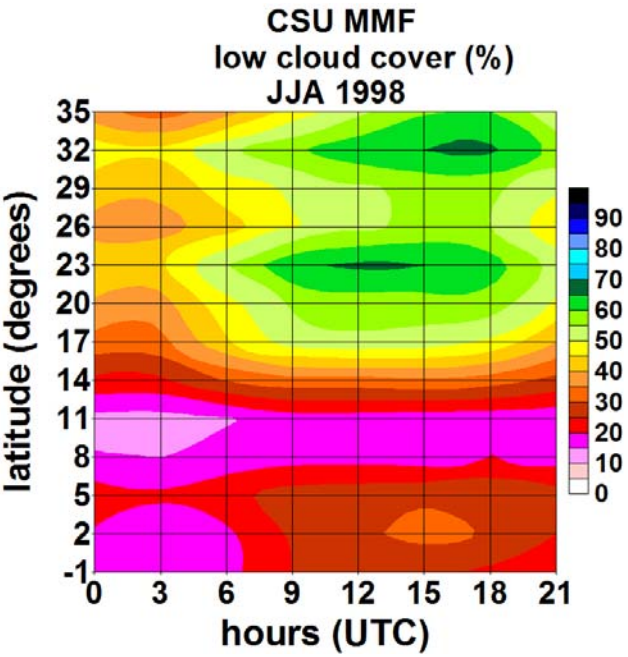


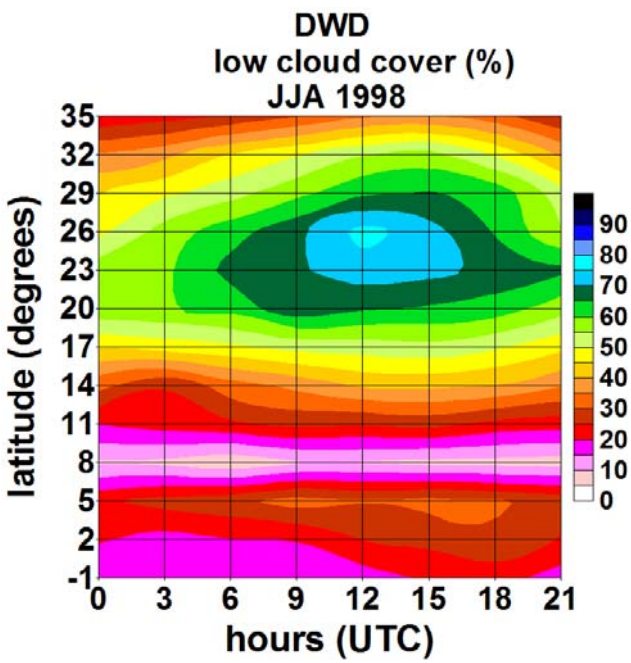


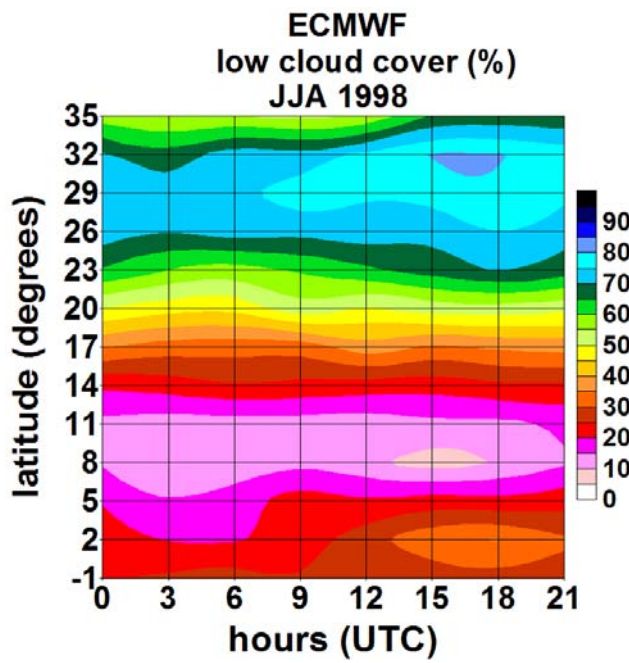


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: low cloud cover.

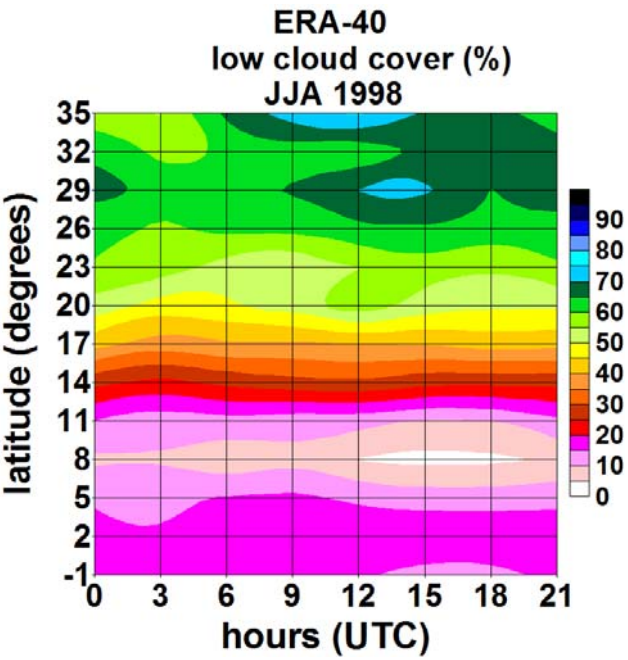


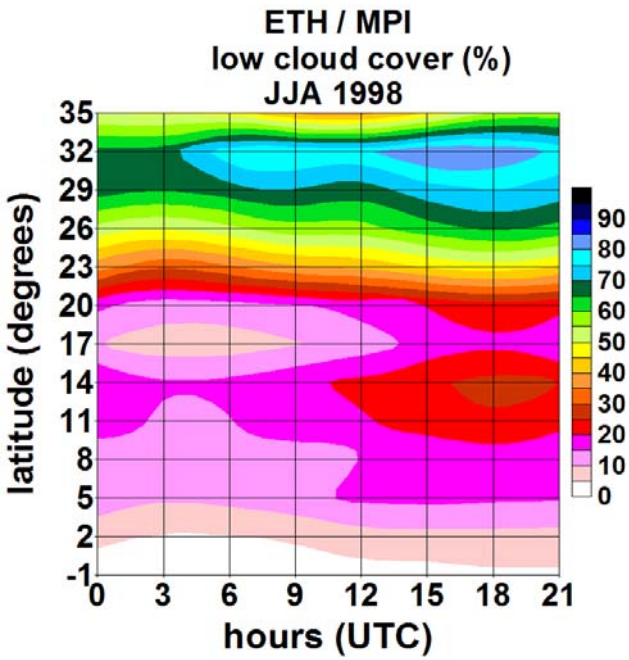


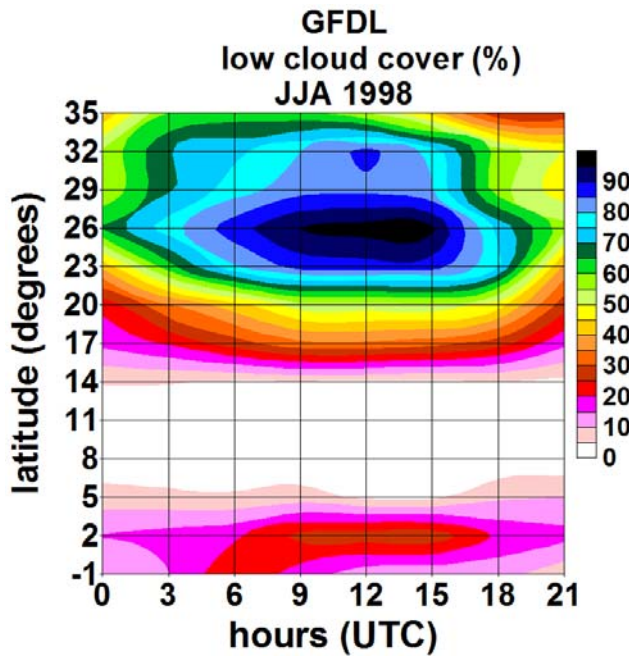


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: low cloud cover.

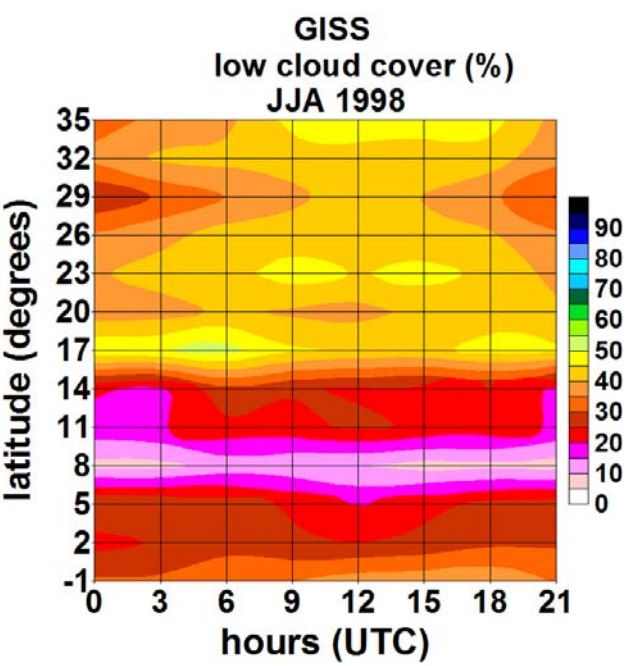


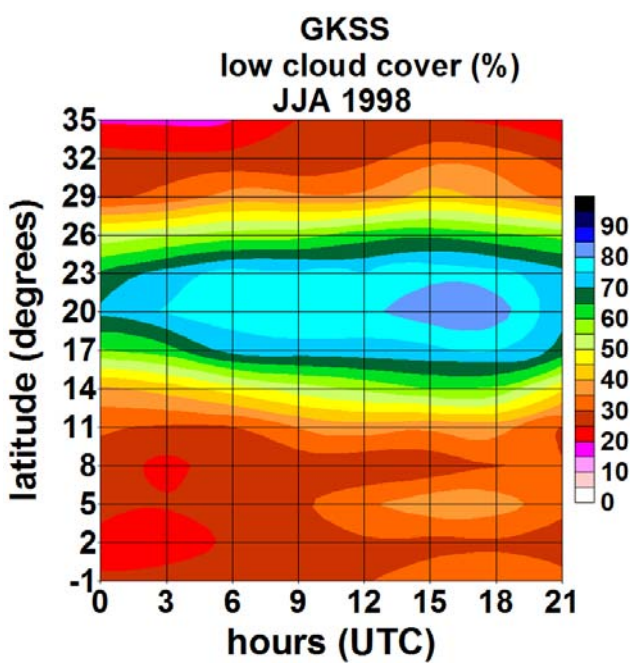


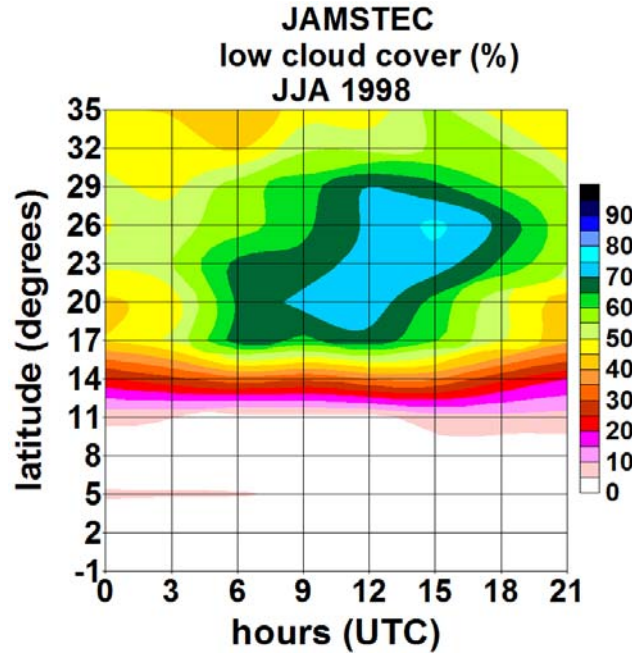


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: low cloud cover.

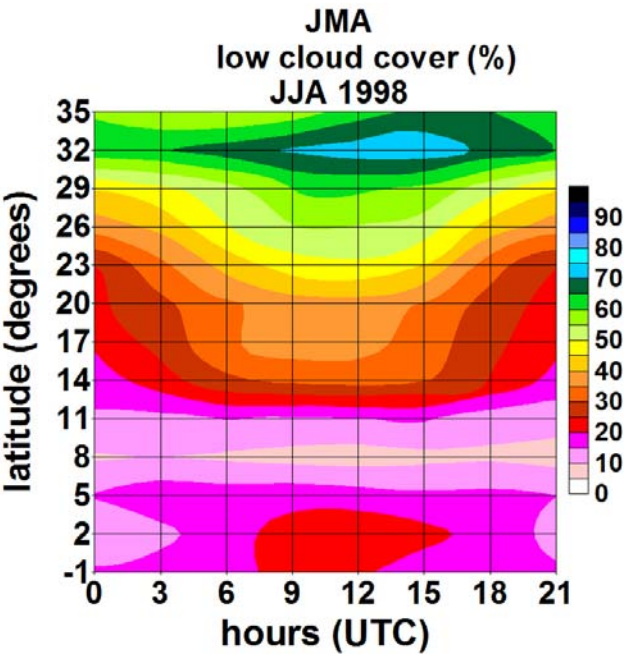


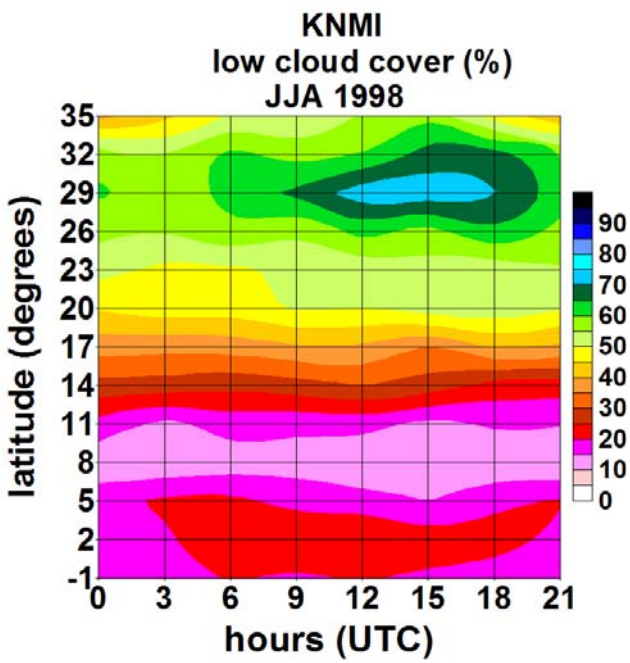


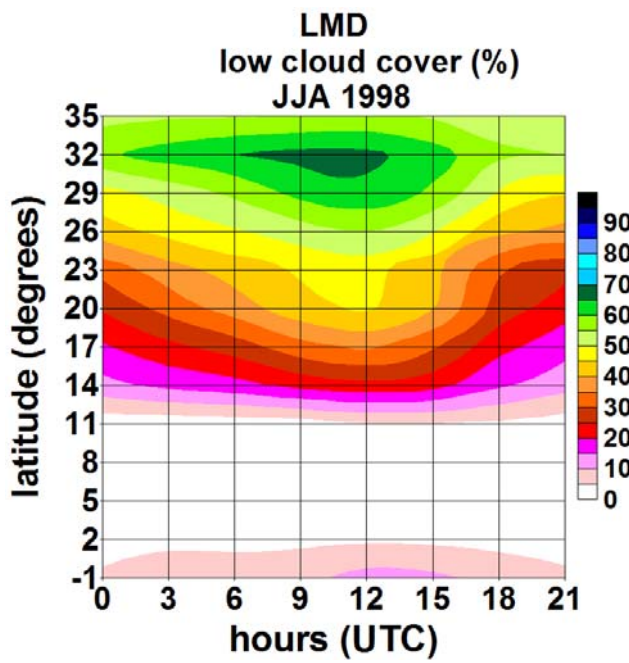


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: low cloud cover.

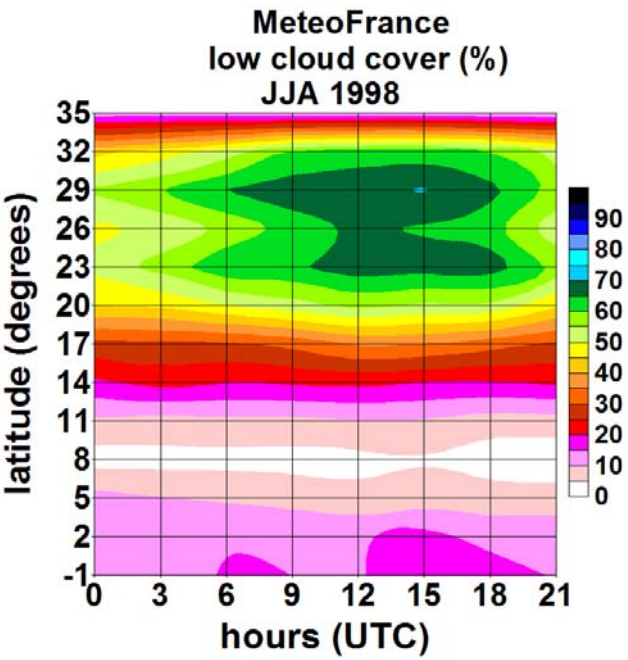


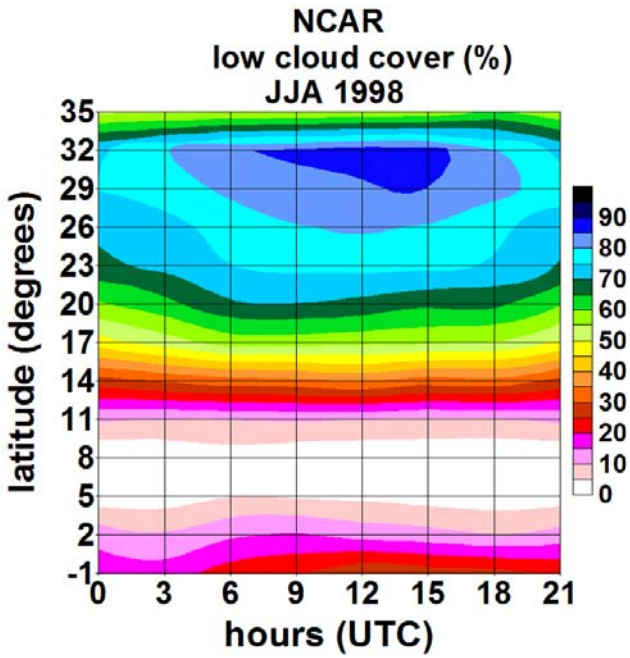


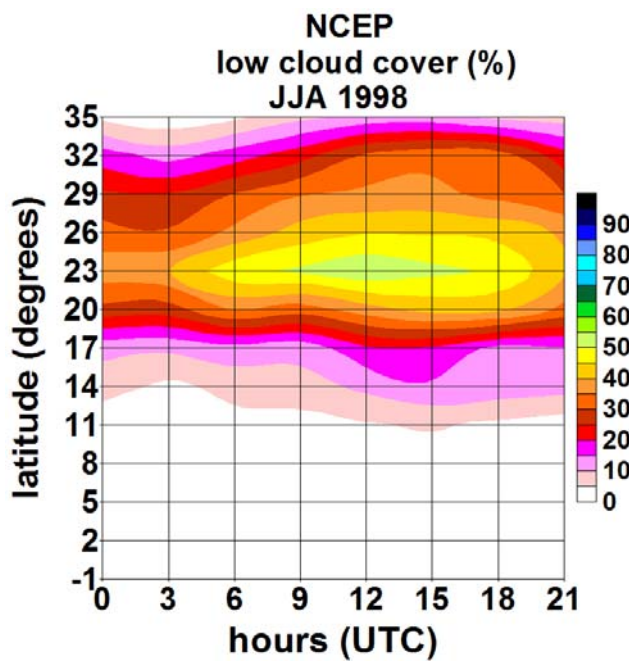


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: low cloud cover.

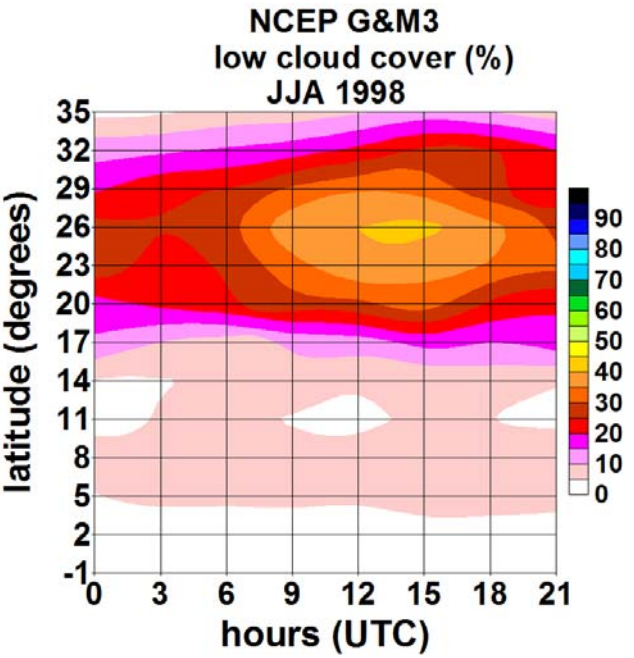


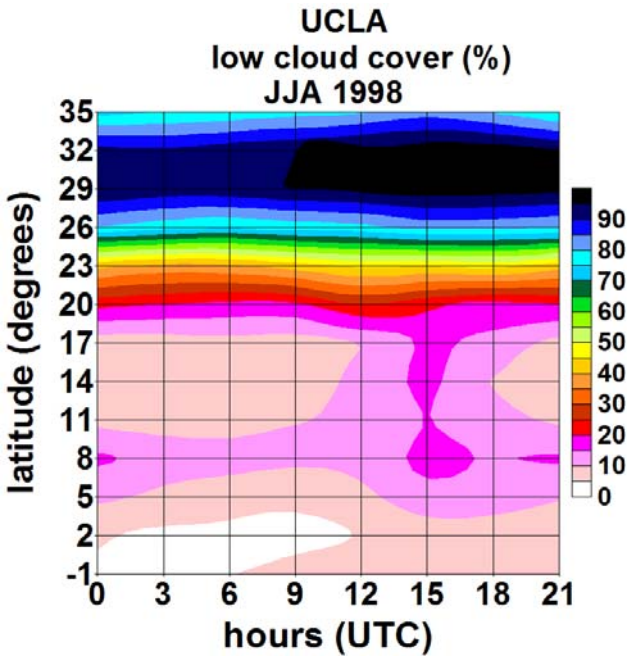


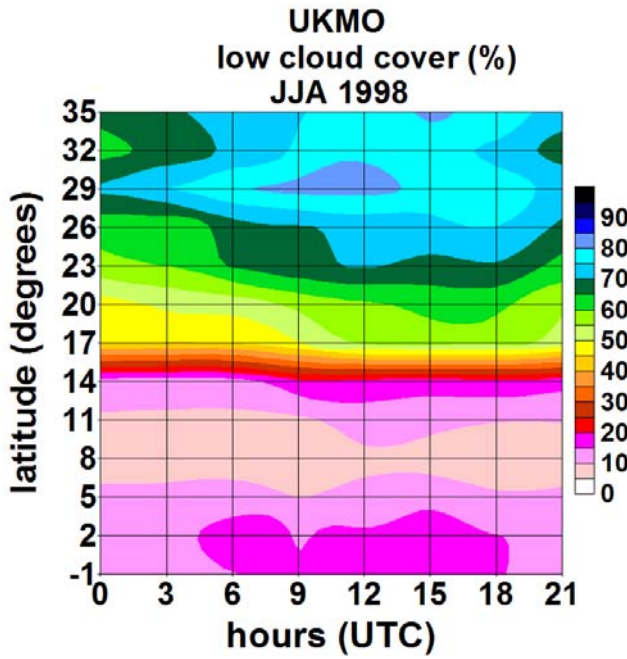


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 mean diurnal cycle: low cloud cover.

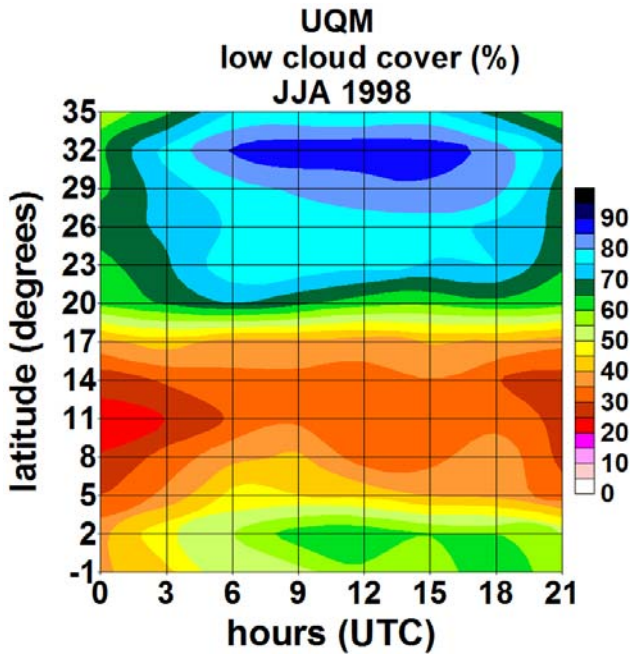






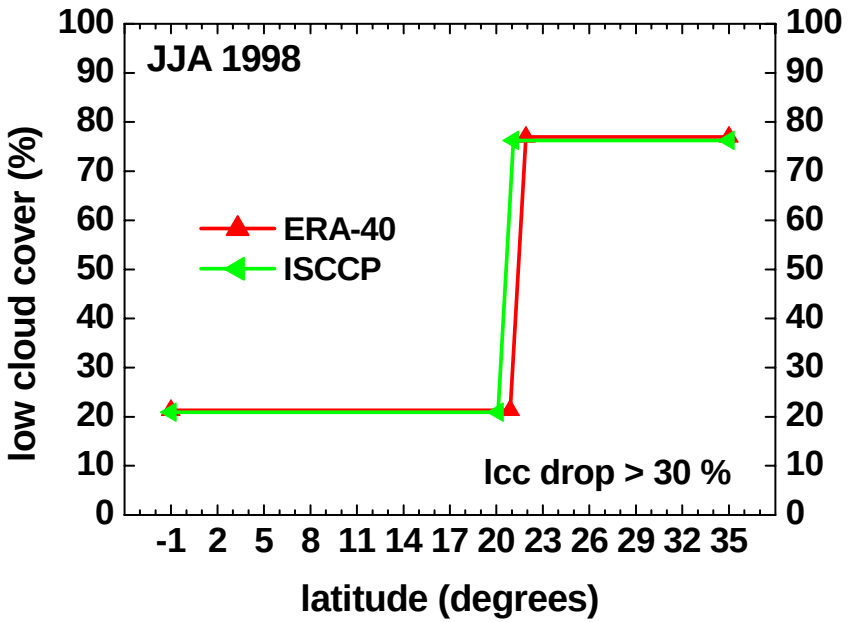
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

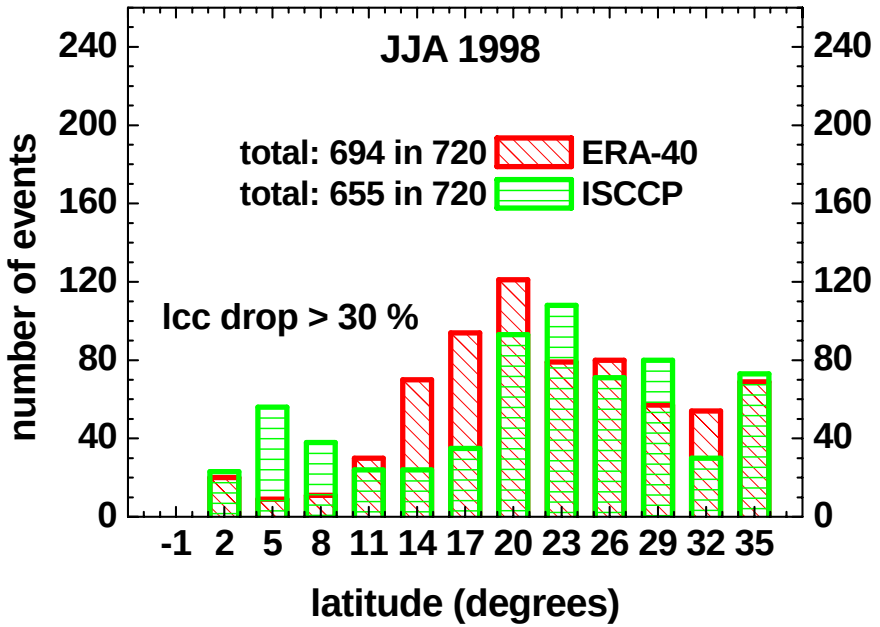
JJA 1998 mean diurnal cycle: low cloud cover.



GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.

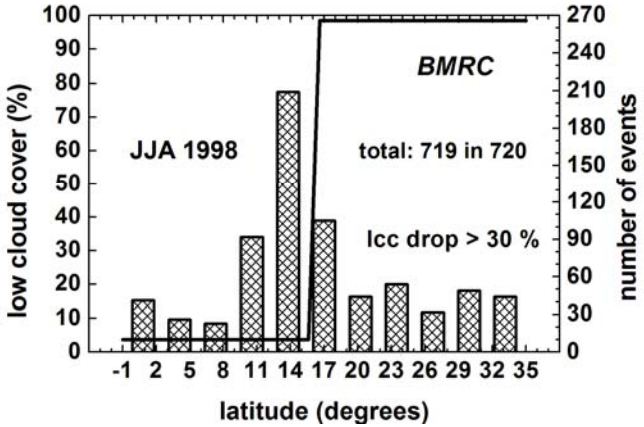


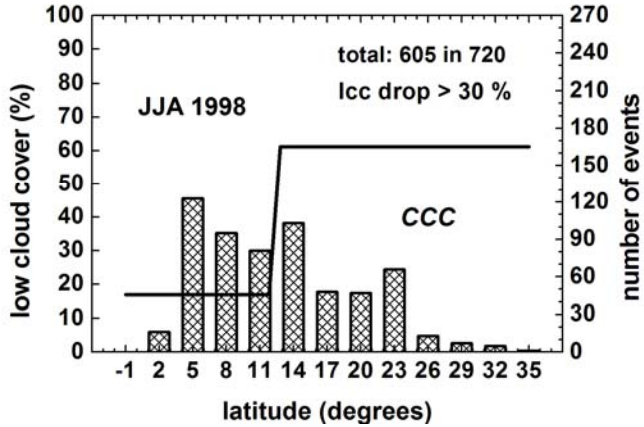


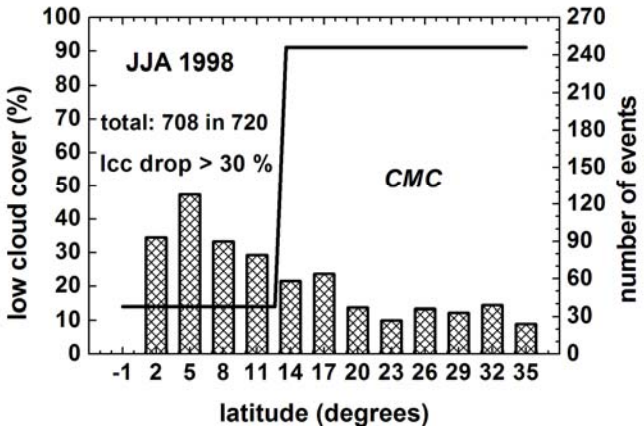
OBS: the ISCCP data presented here for the GPCI cross-section comes from the PCTAU dataset (*ftp://gcss-dime.giss.nasa.gov/PACCROSS/PCTAU*) and is a blend between VIS&IR.

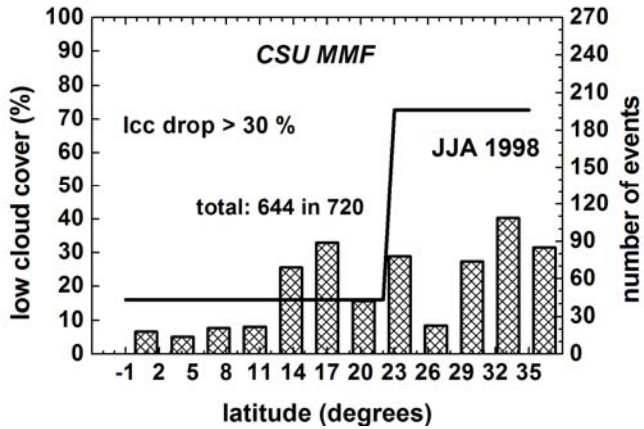
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.



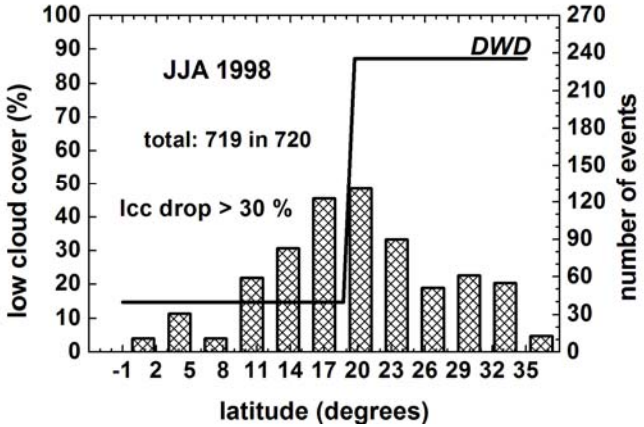


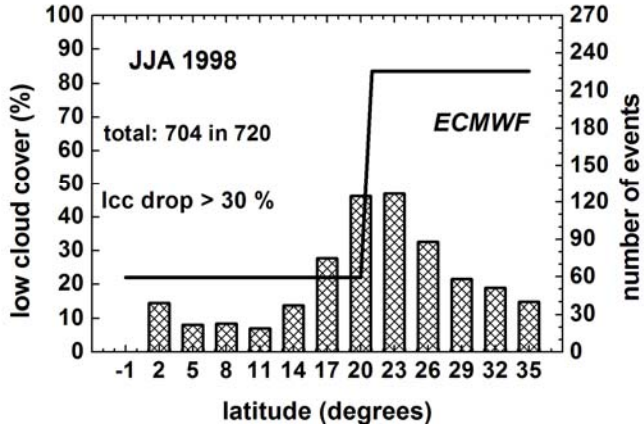


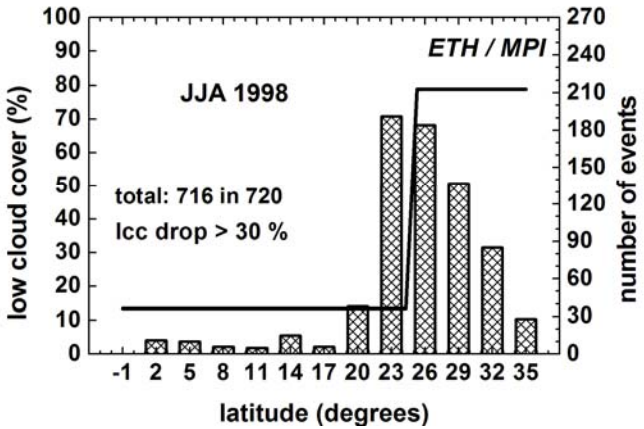


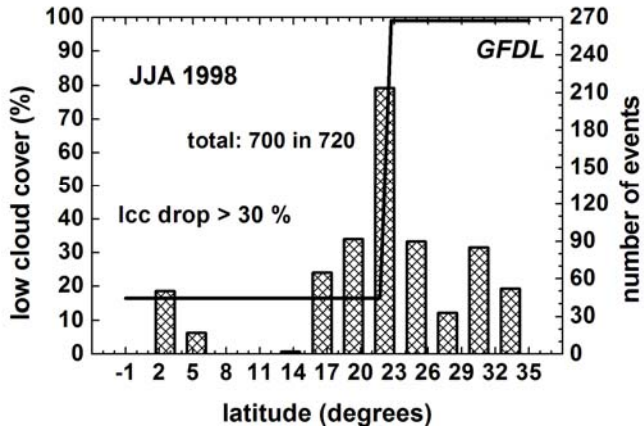
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.



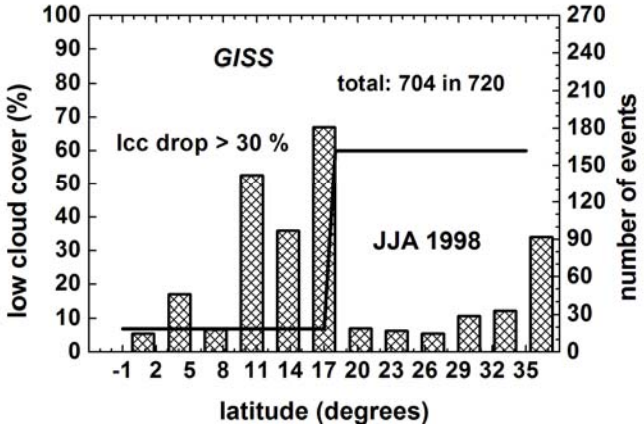


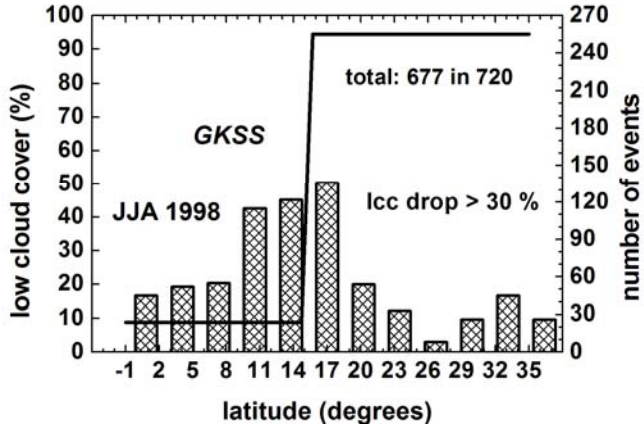


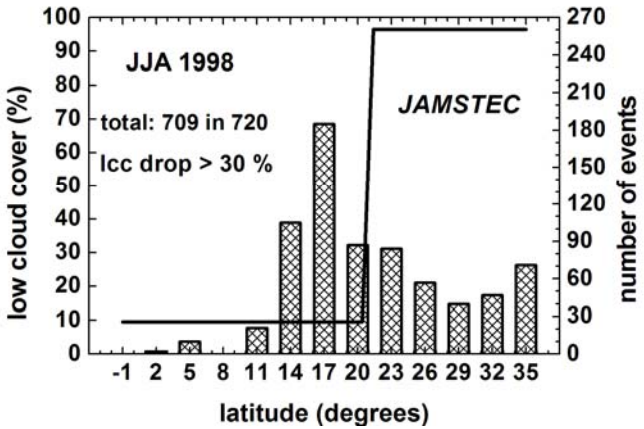


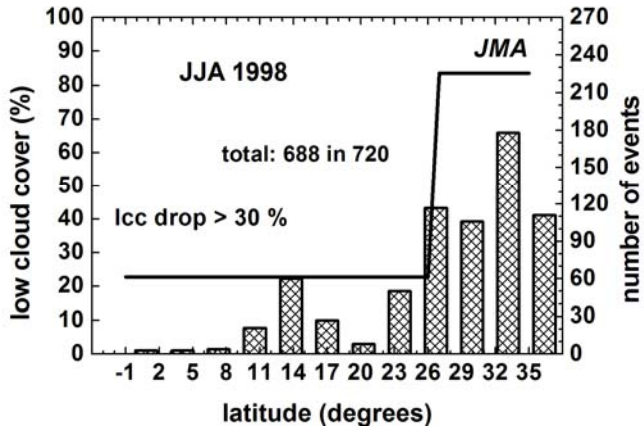
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.



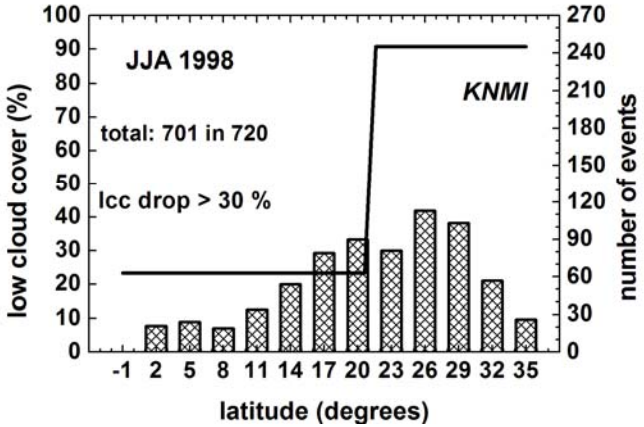


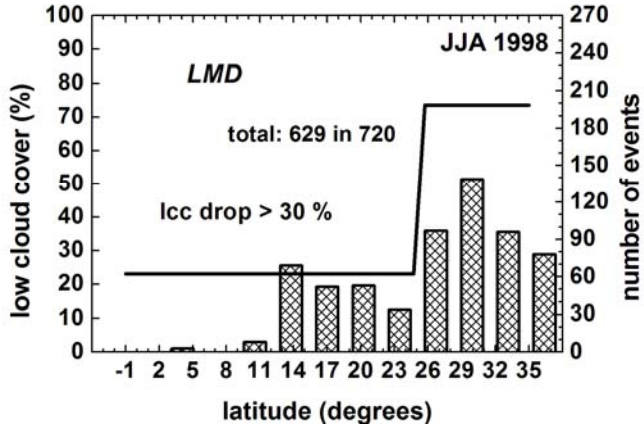


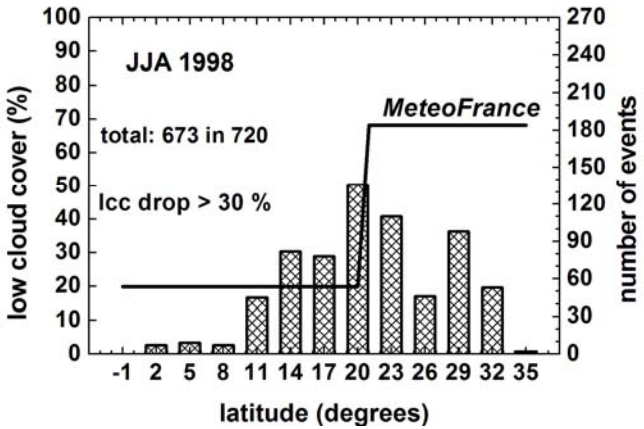


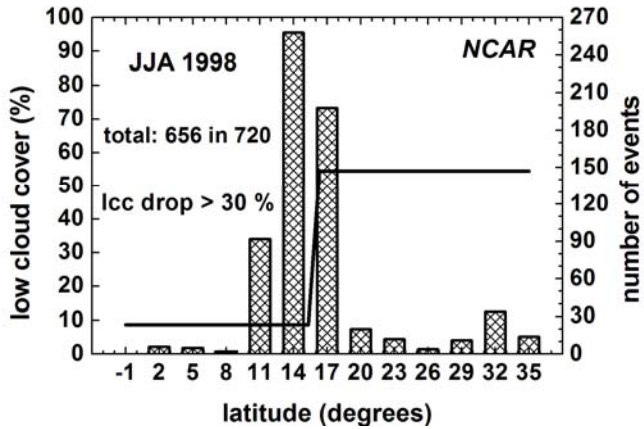
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.



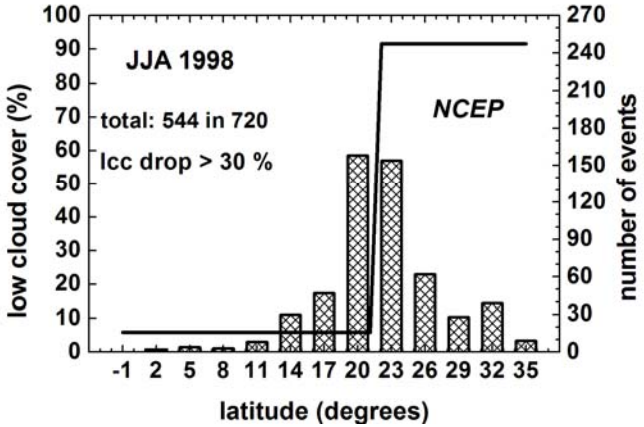


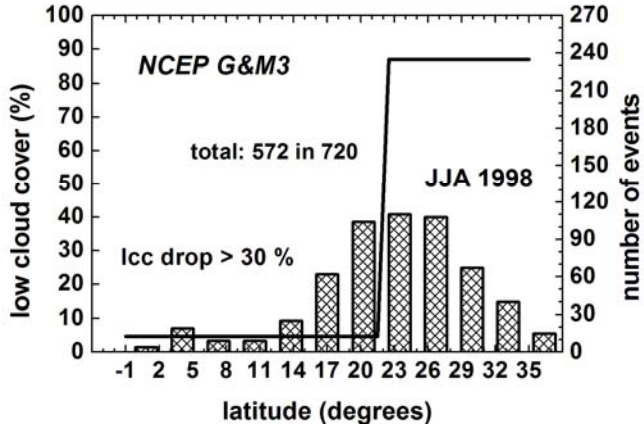


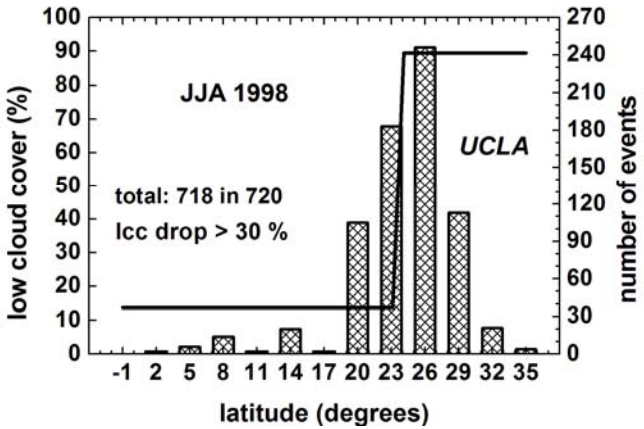


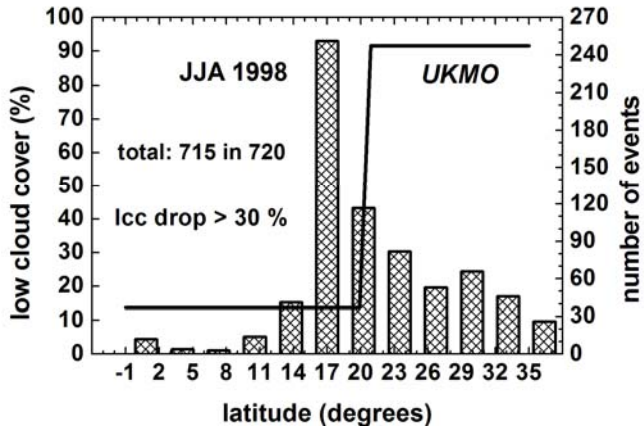
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.



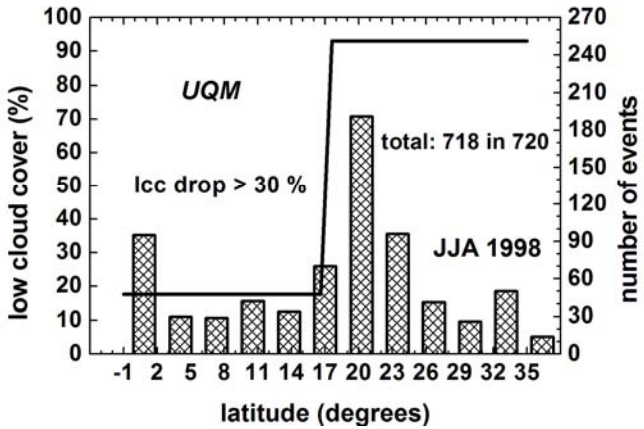






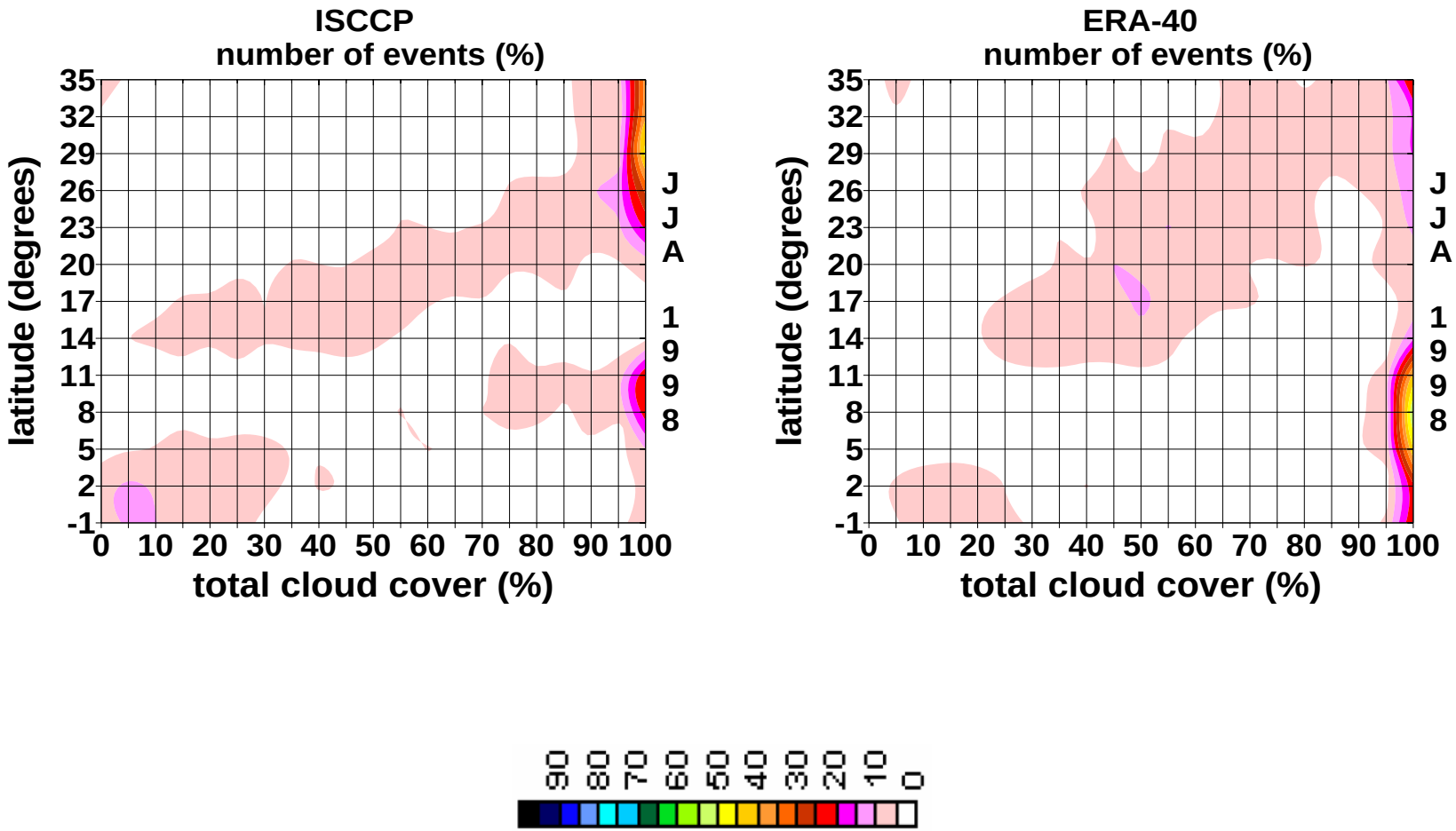
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.



GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

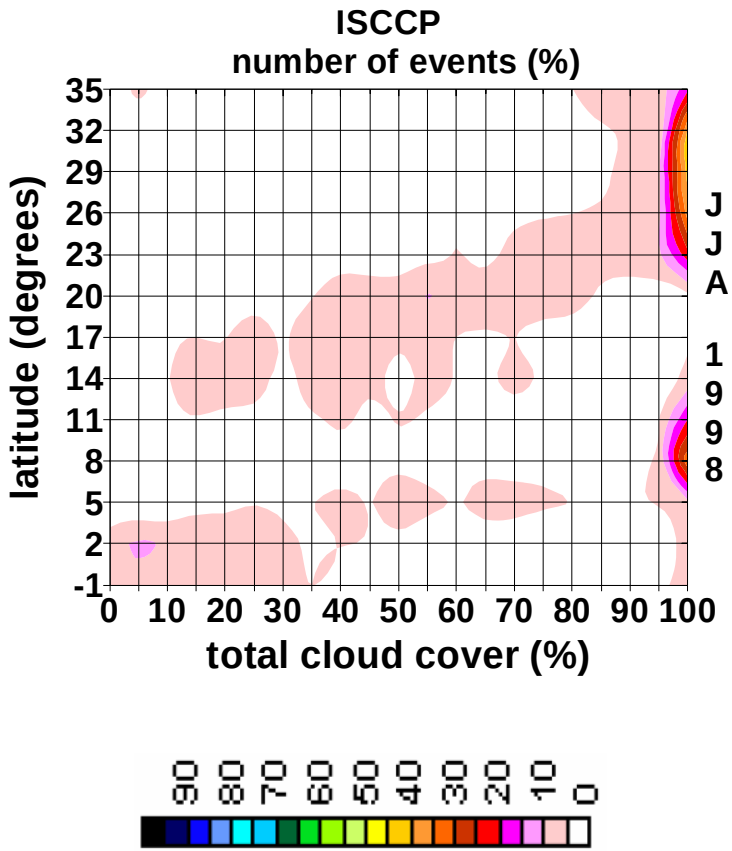
JJA 1998 histograms of total cloud cover.



OBS: the plot to the left corresponds to **pctau VIR**=VIS&IR blended.

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

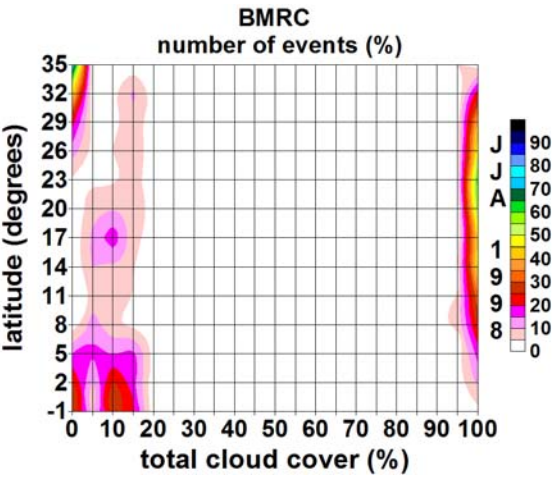
JJA 1998 histograms of total cloud cover.

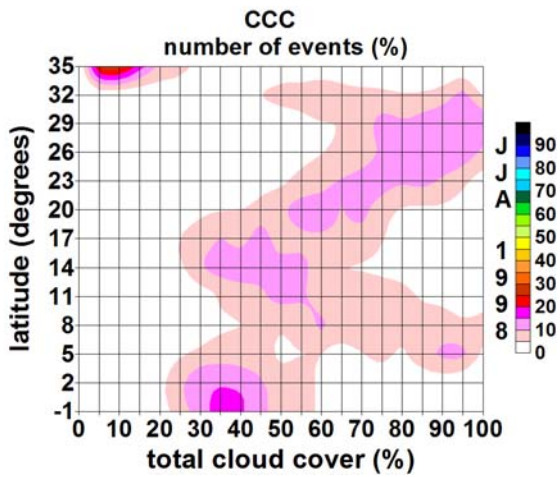


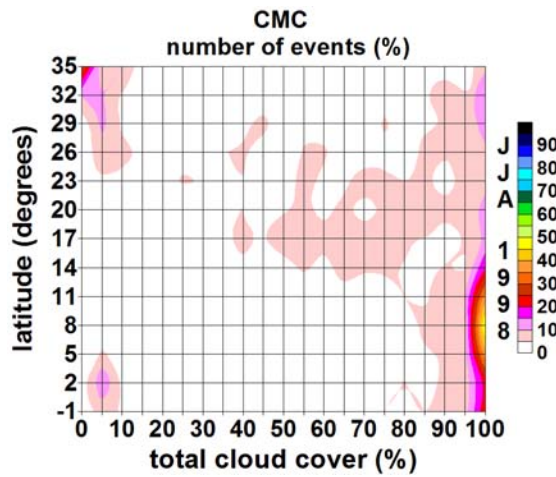
OBS: the ISCCP data presented here for the GPCI cross-section comes from the ISCCP D1 dataset (*http://gcss-dime.giss.nasa.gov/paccross/browse_dx_paccross.html*) .

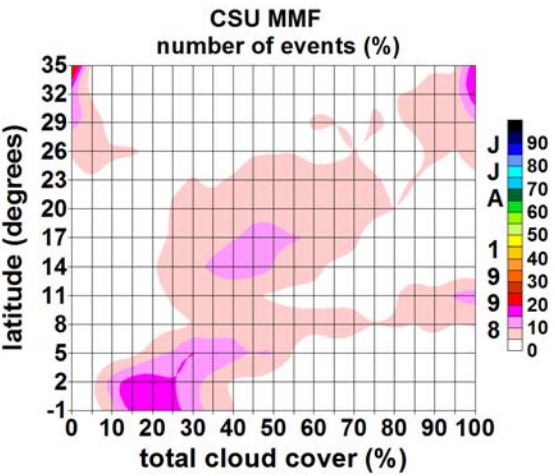
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

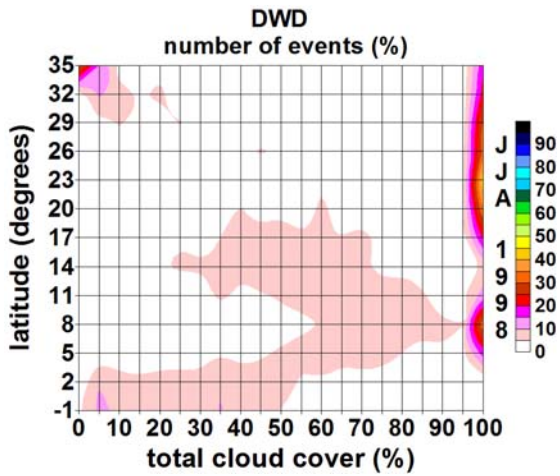
JJA 1998 histograms of total cloud cover.

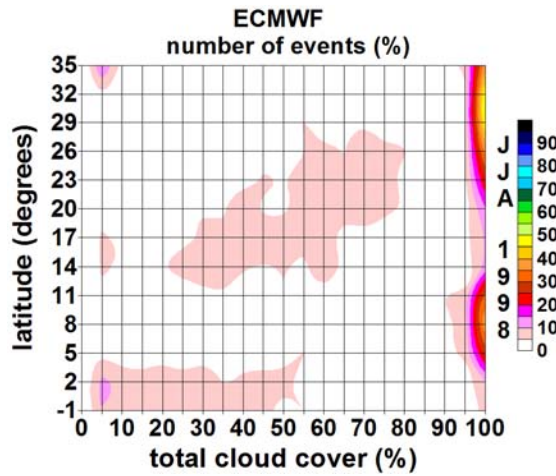






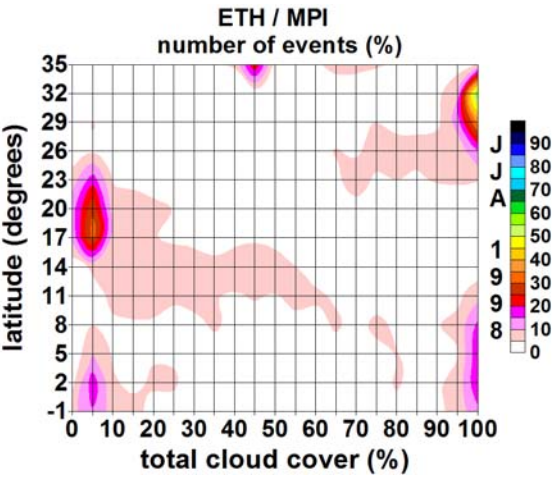


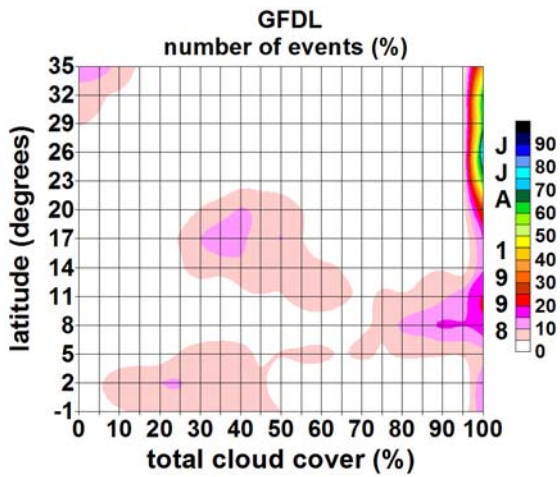


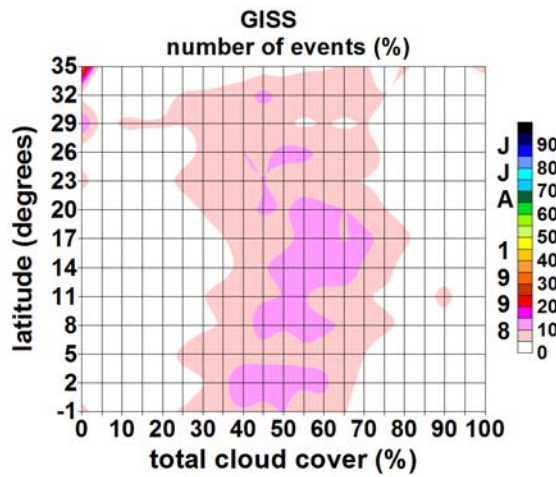


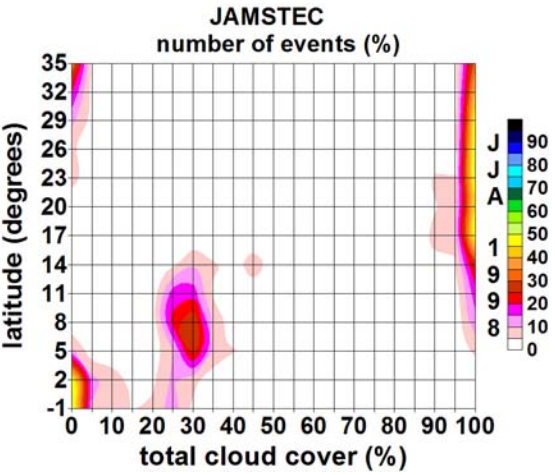
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

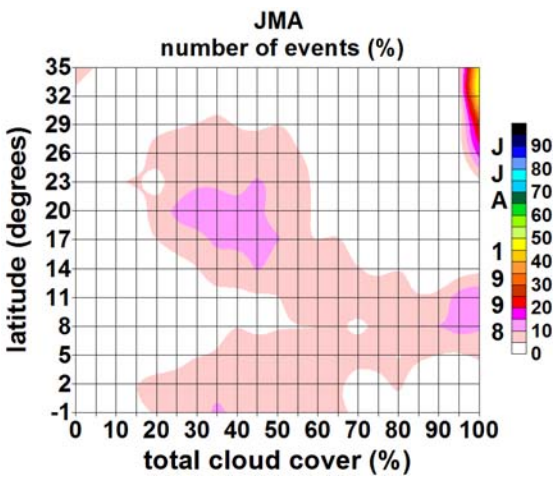
JJA 1998 histograms of total cloud cover.

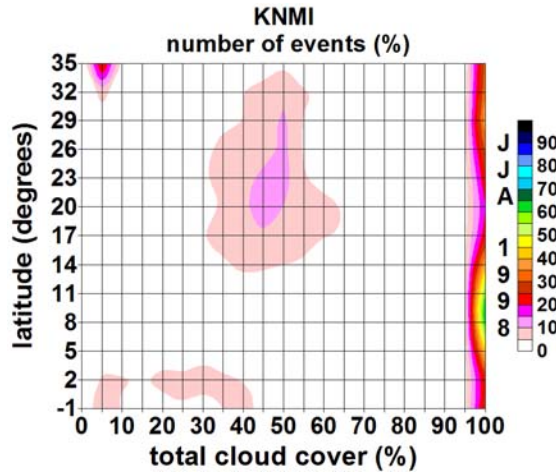






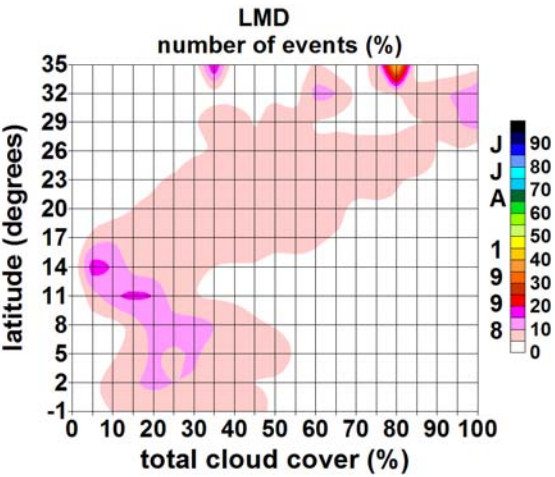


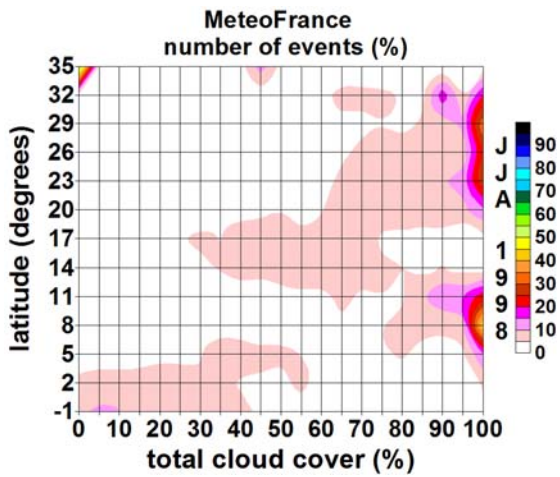


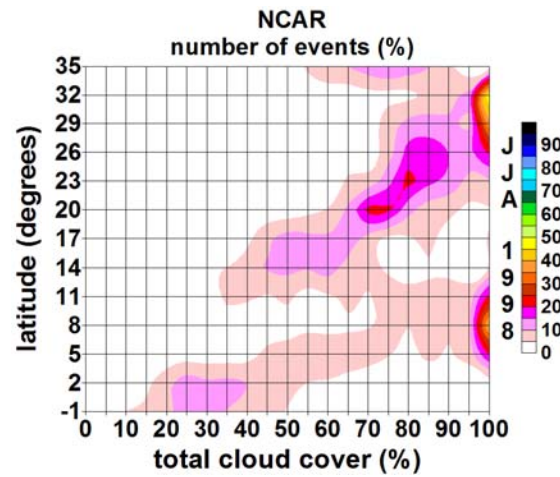


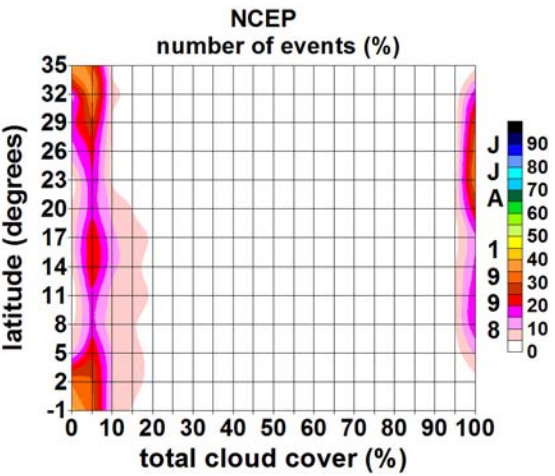
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

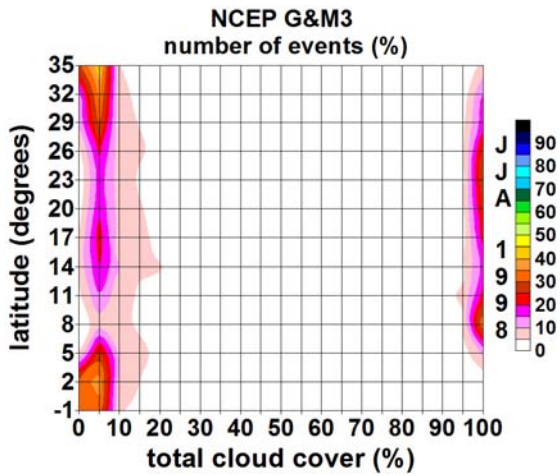
JJA 1998 histograms of total cloud cover.

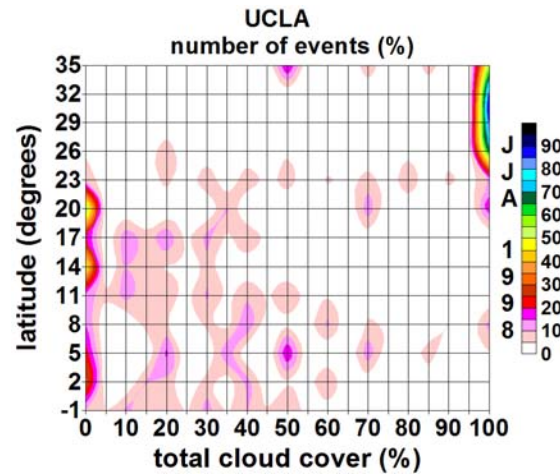






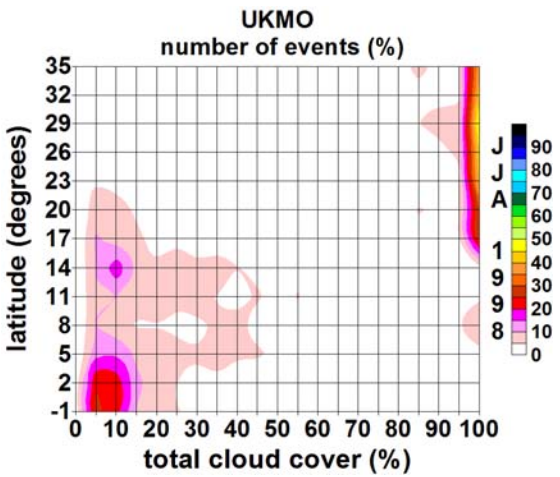


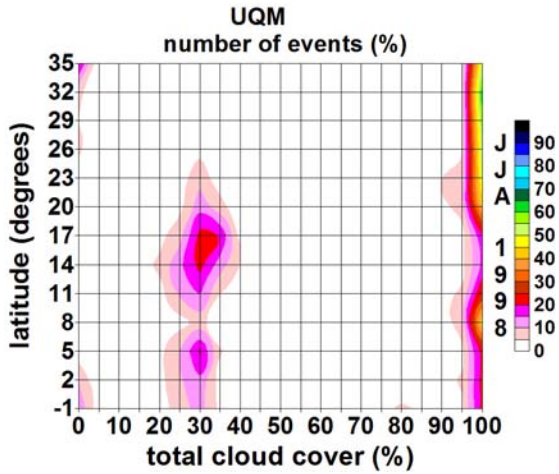




GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 1998 histograms of total cloud cover.

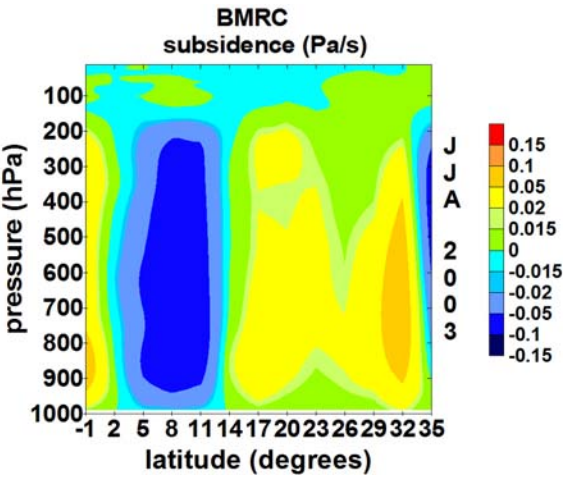


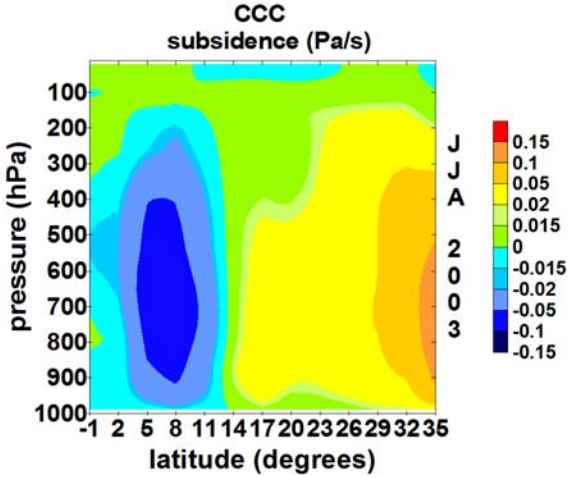


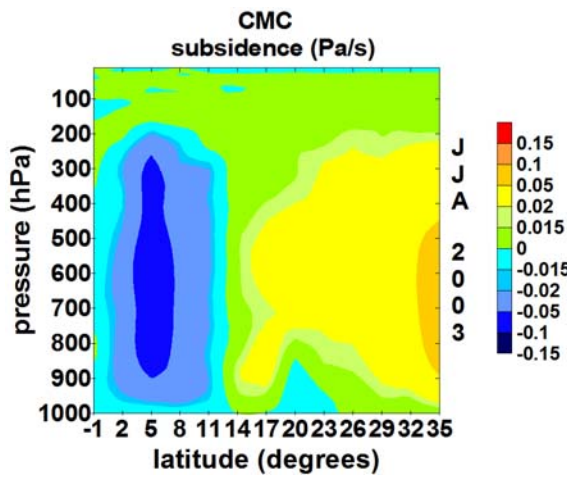
2003 Results

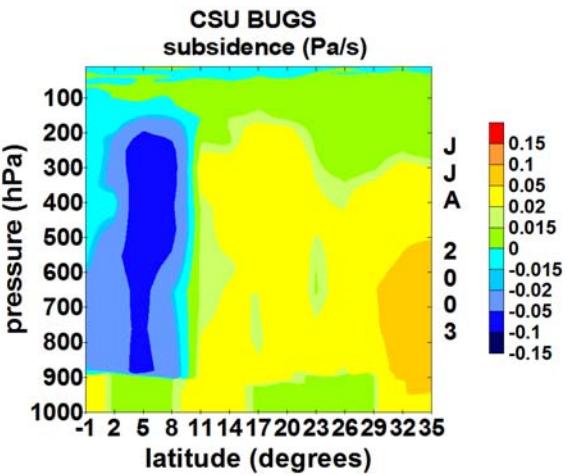
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

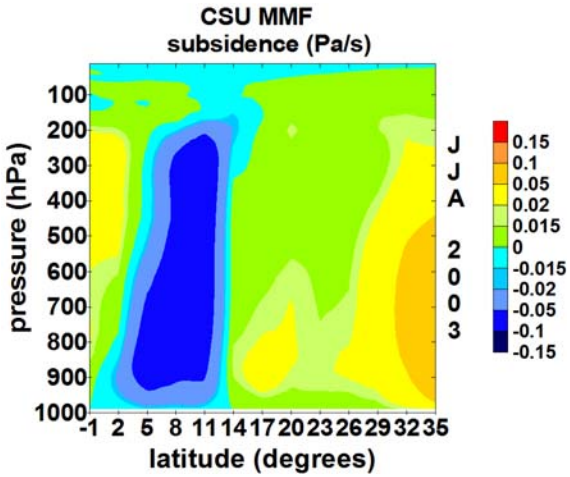
JJA 2003 mean vertical profiles. subsidence (Pa/s)

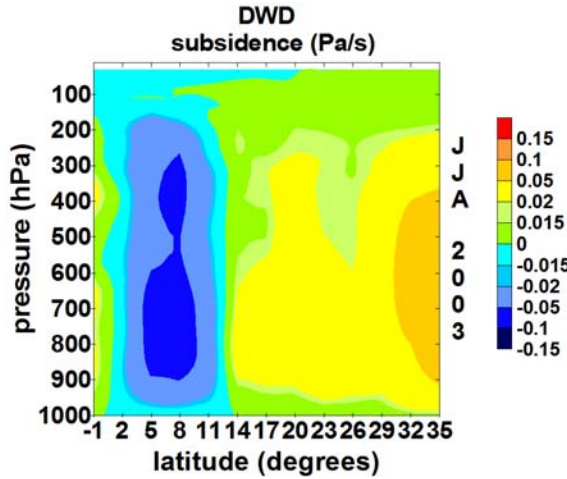






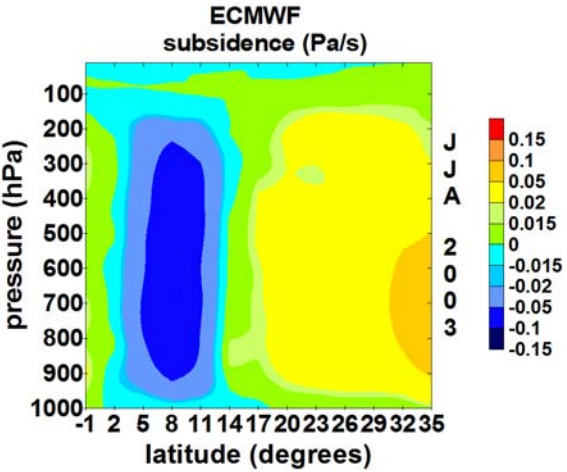


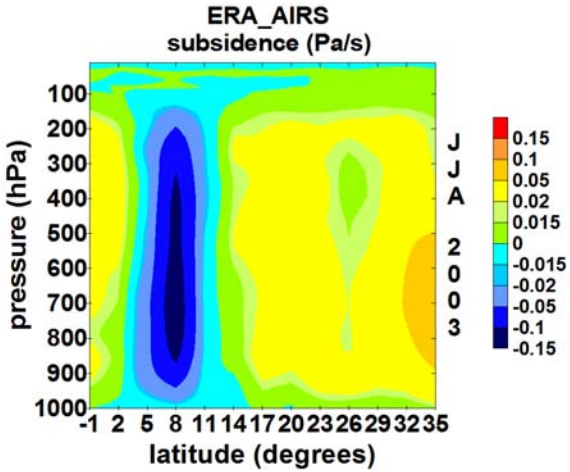


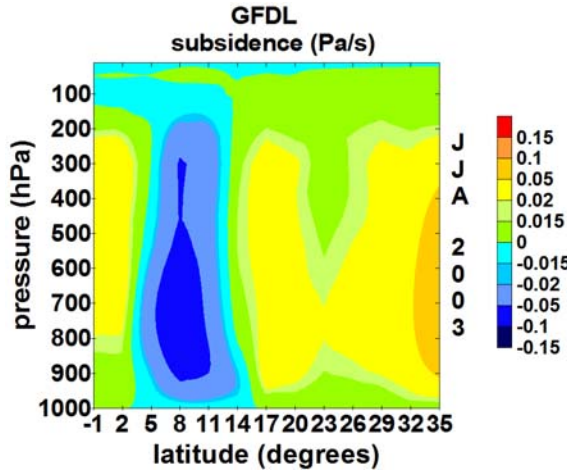


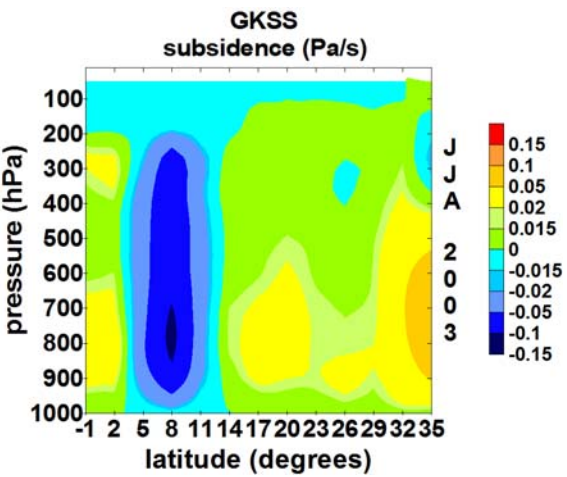
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

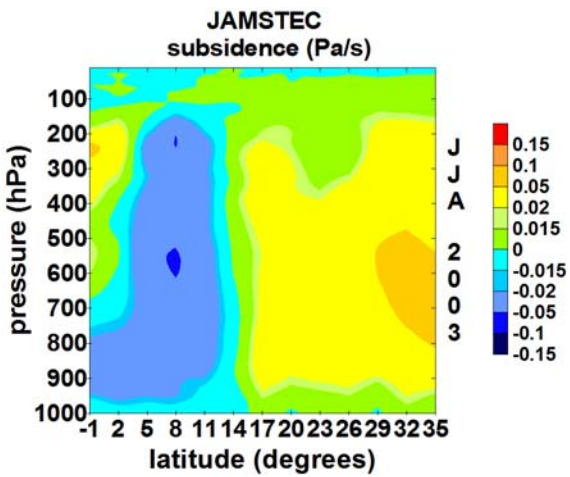
JJA 2003 mean vertical profiles. subsidence (Pa/s)

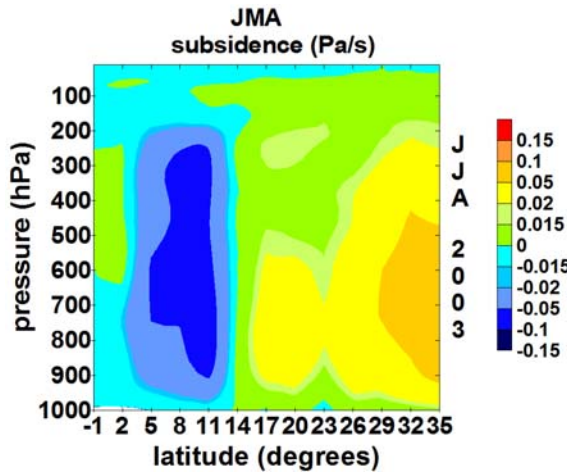






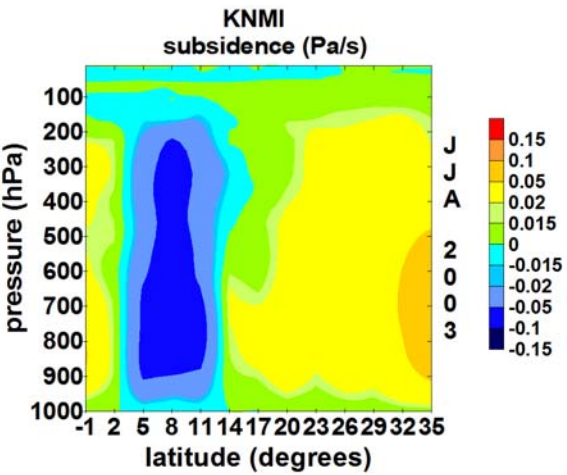


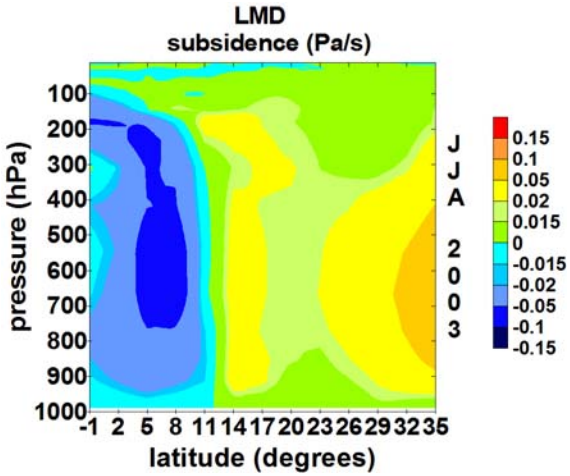


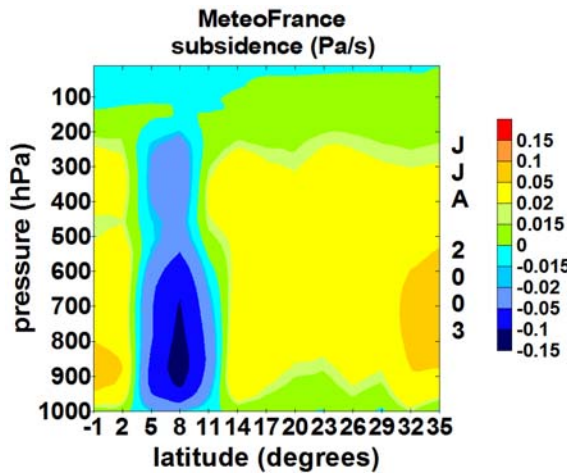


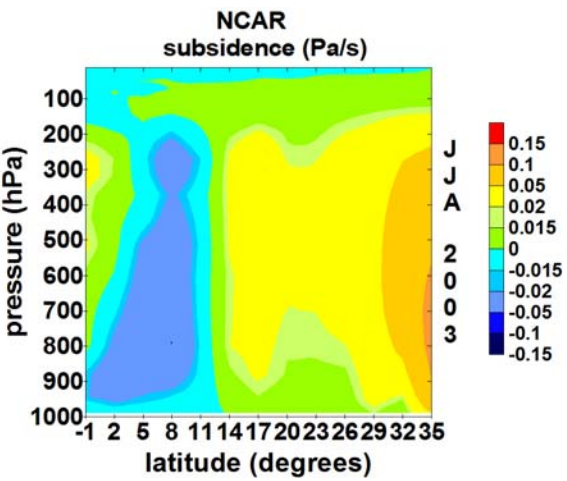
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

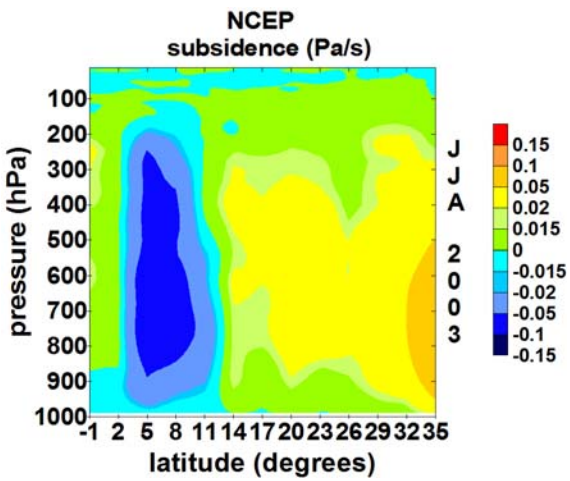
JJA 2003 mean vertical profiles. subsidence (Pa/s)

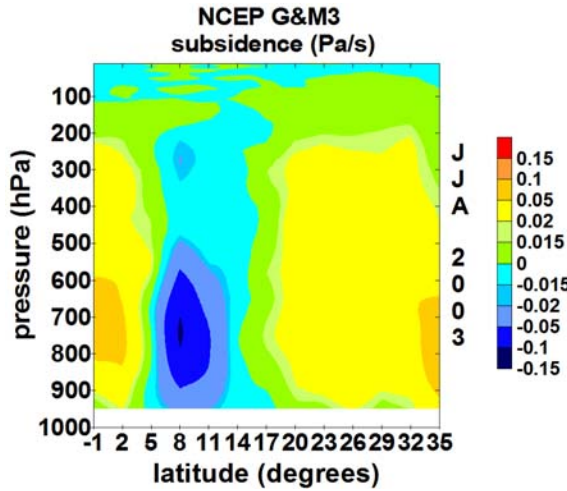






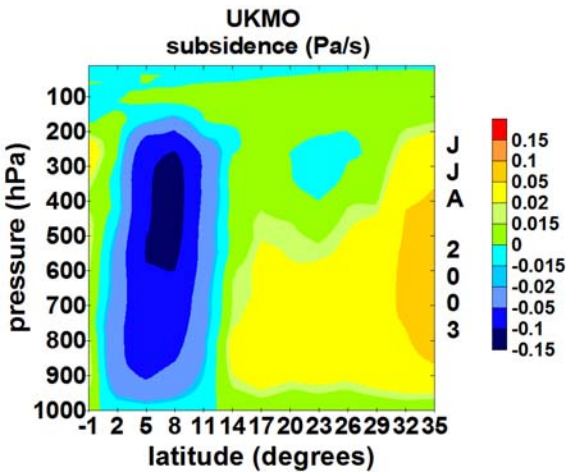


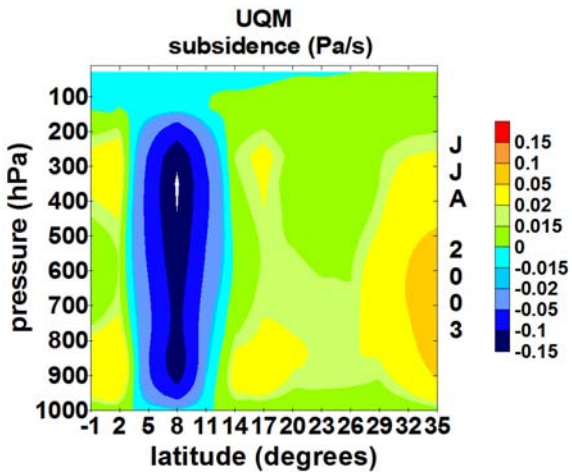




GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

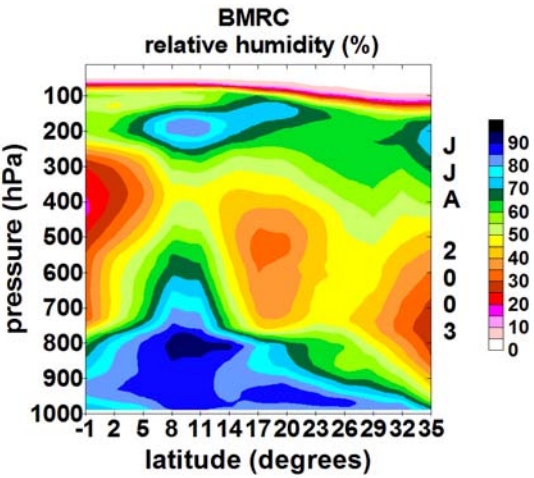
JJA 2003 mean vertical profiles. subsidence (Pa/s)

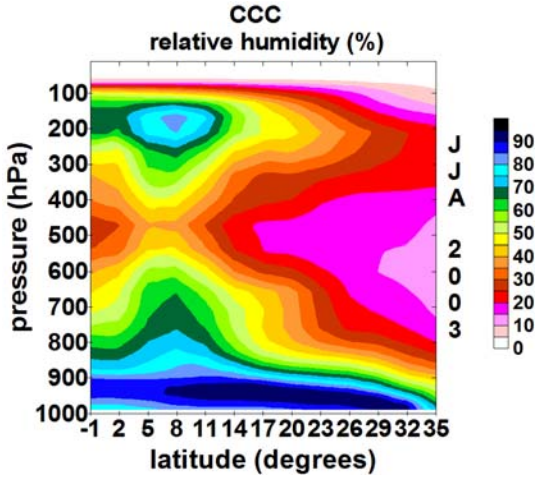


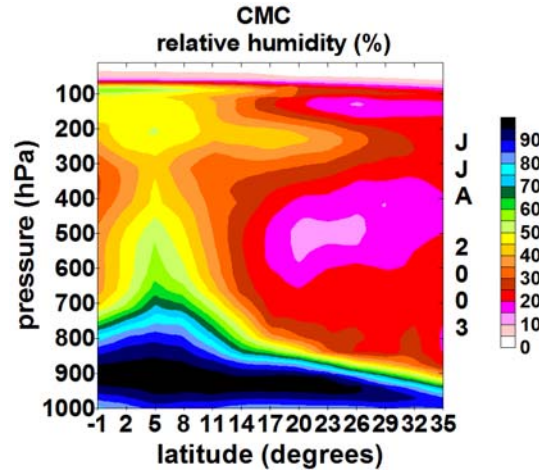


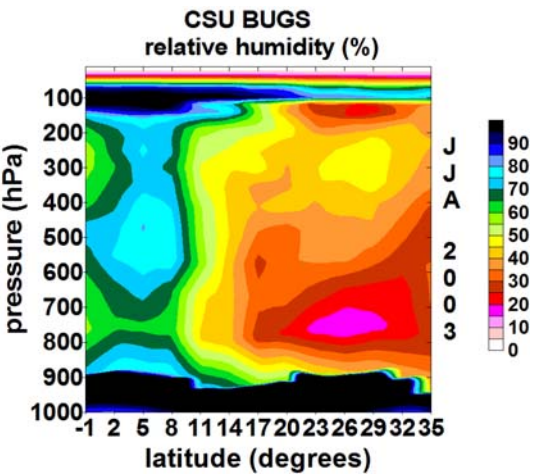
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

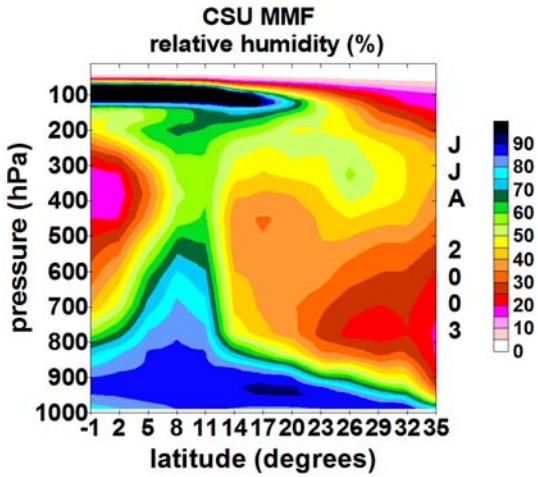
JJA 2003 mean vertical profiles. relative humidity (%)

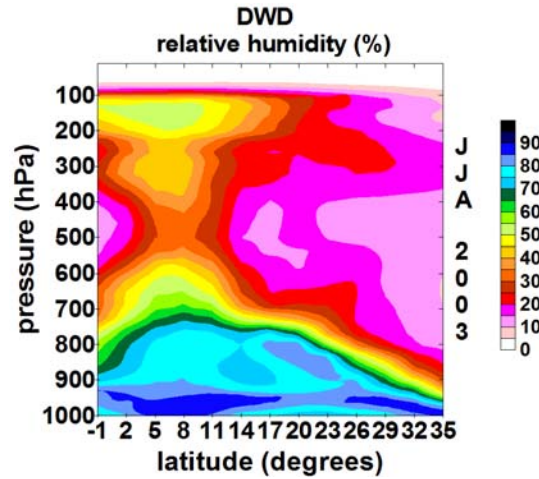






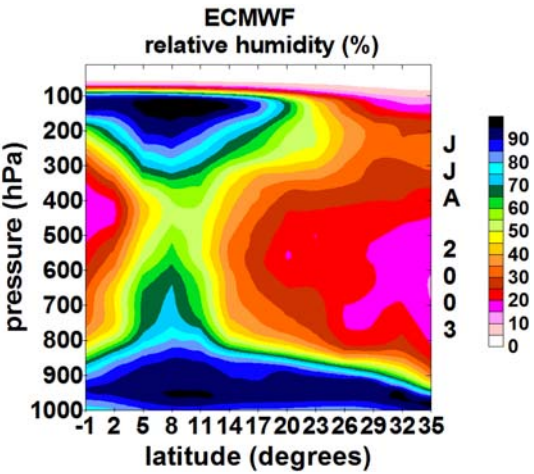


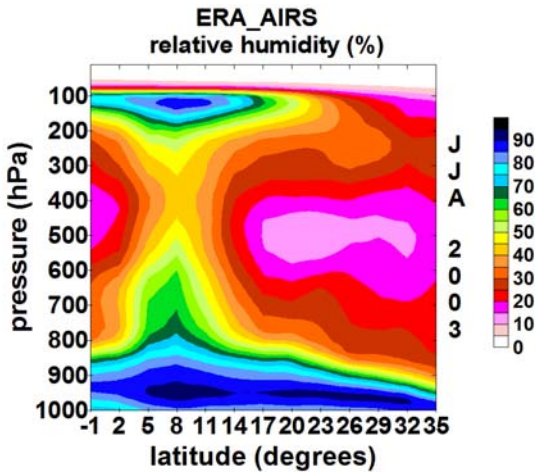


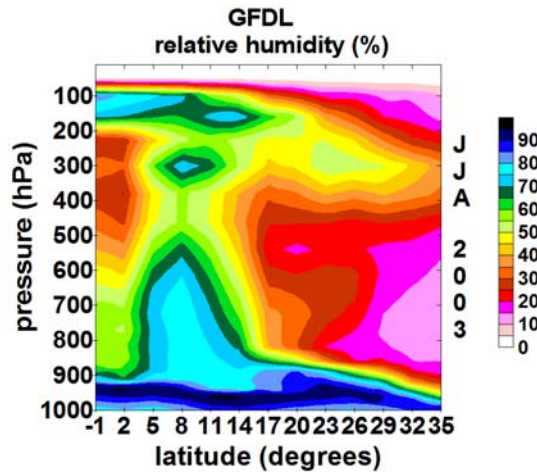


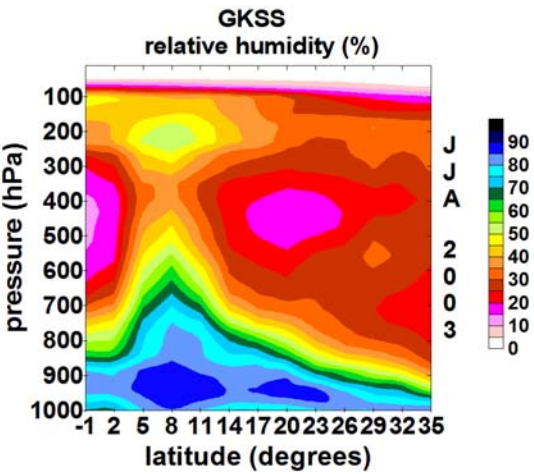
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

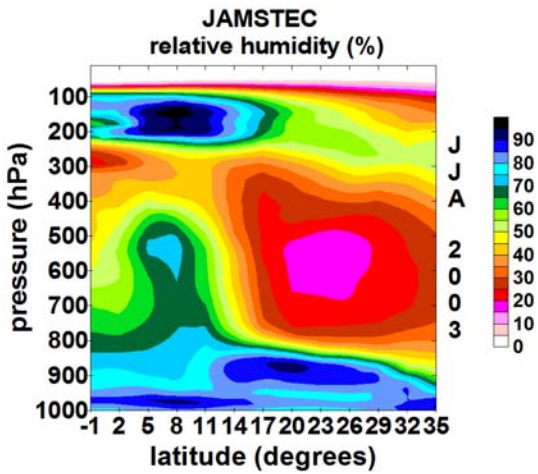
JJA 2003 mean vertical profiles. relative humidity (%)

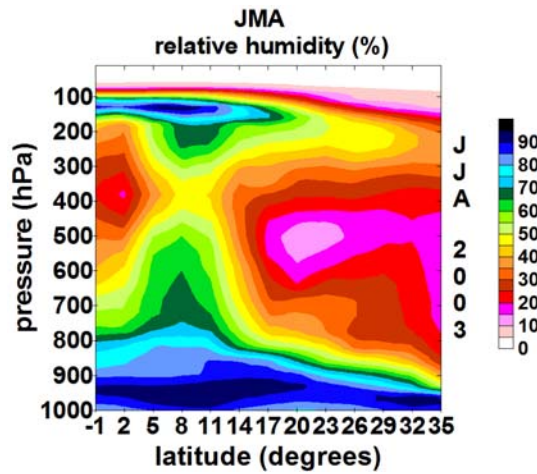






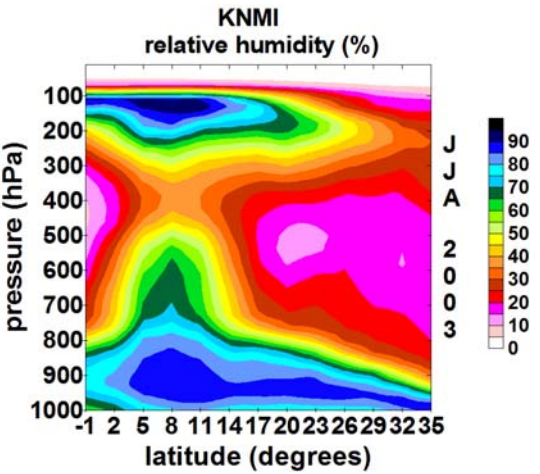


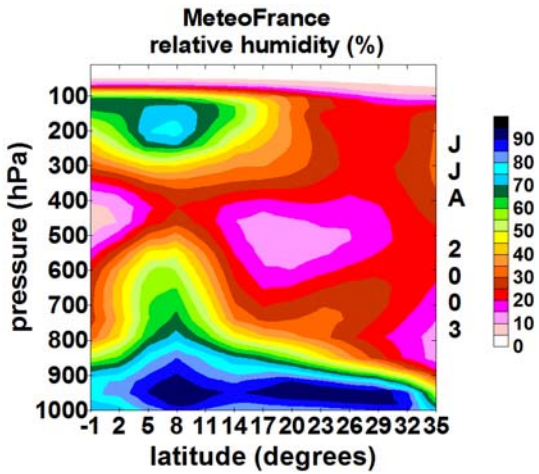


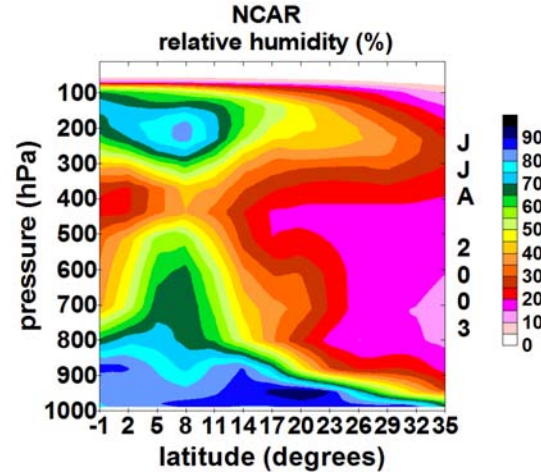


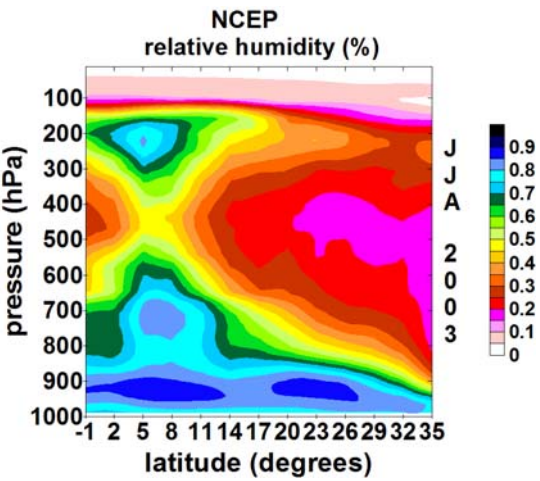
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

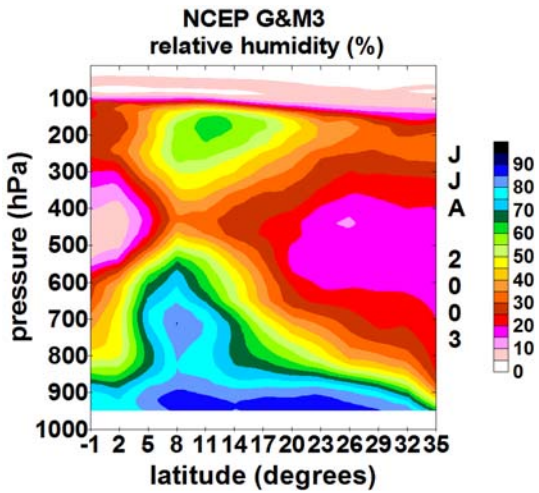
JJA 2003 mean vertical profiles. relative humidity (%)

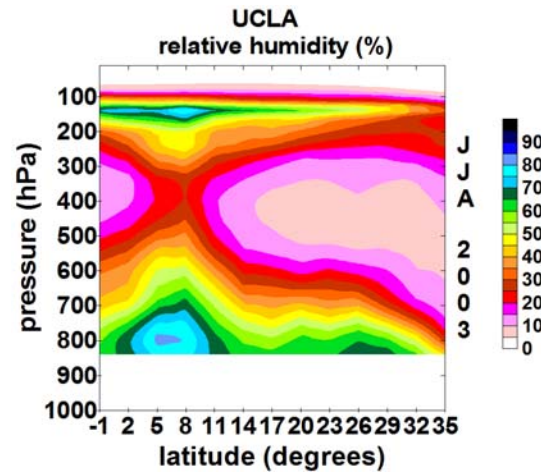






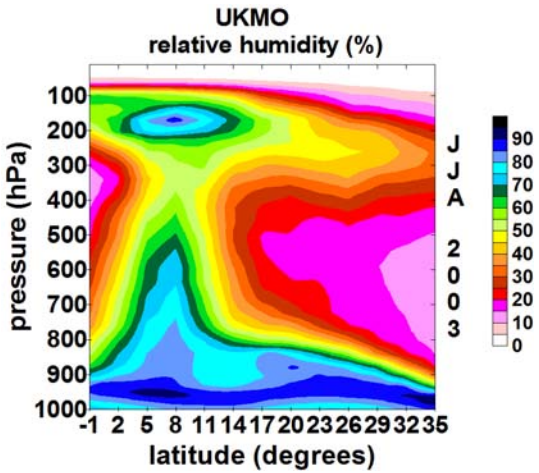


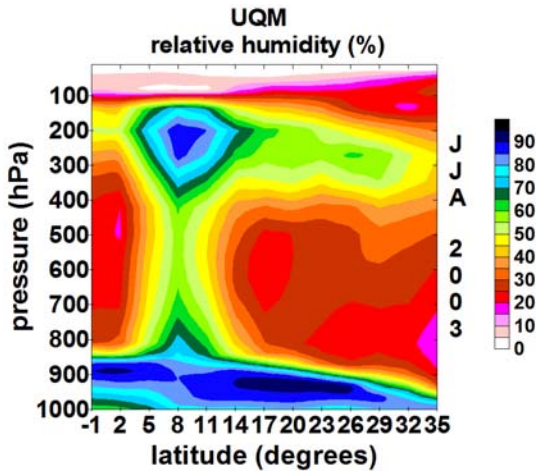




GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

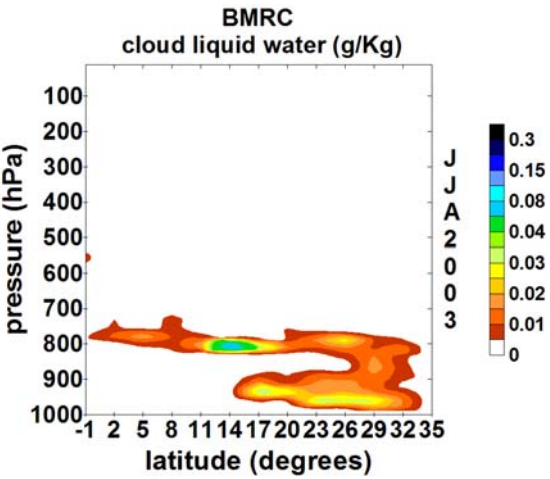
JJA 2003 mean vertical profiles. relative humidity (%)

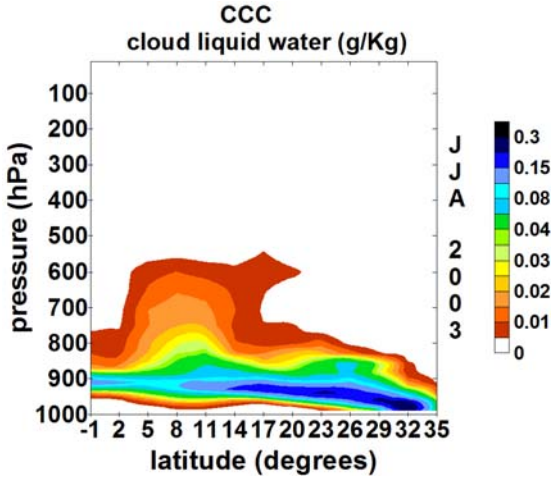


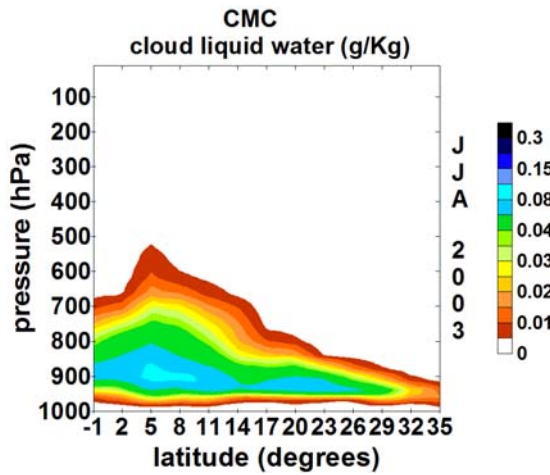


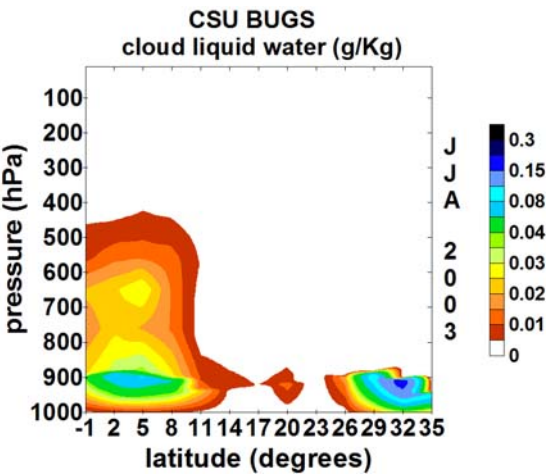
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

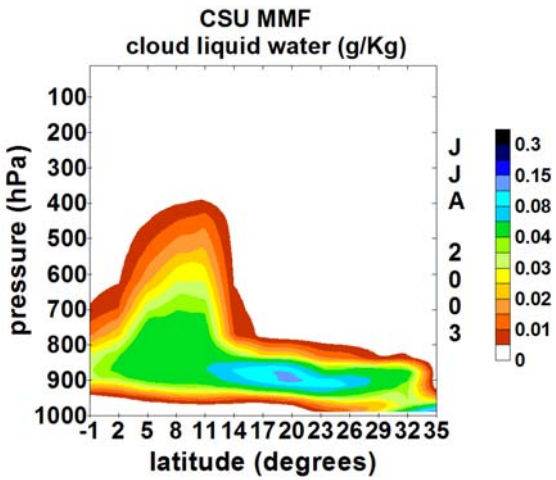
JJA 2003 mean vertical profiles. cloud liquid water (g/Kg)

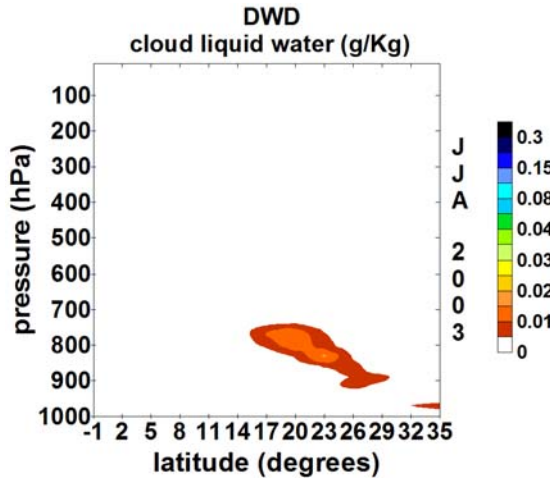






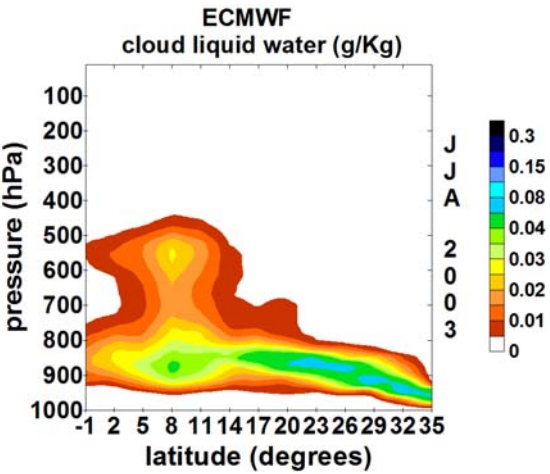


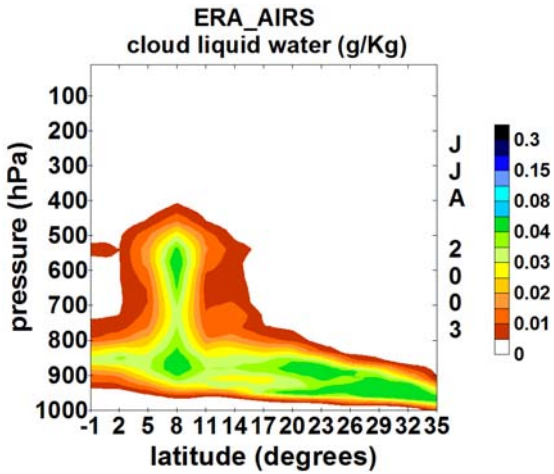


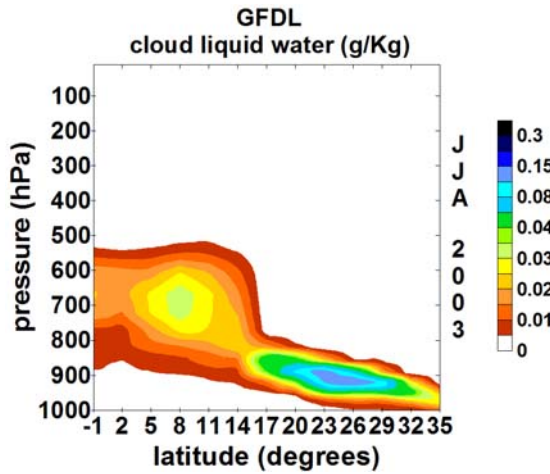


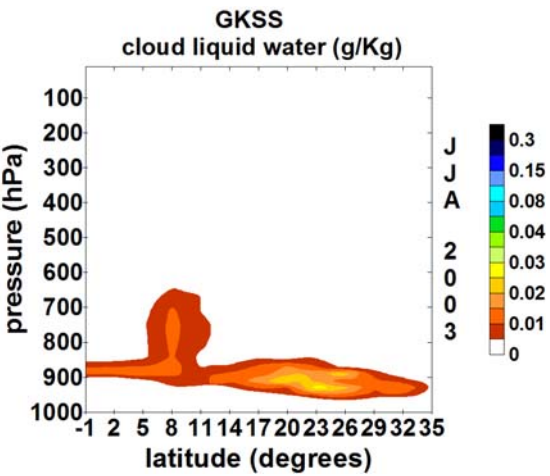
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

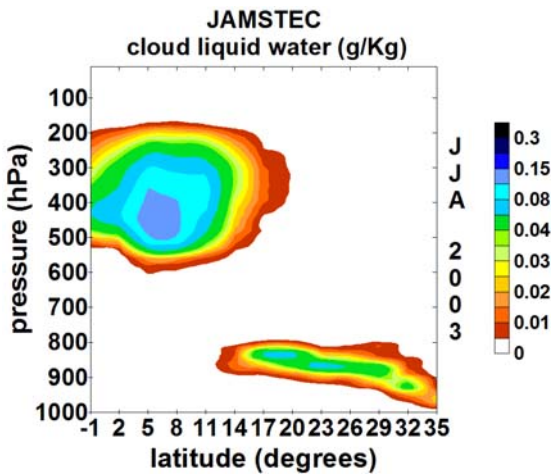
JJA 2003 mean vertical profiles. cloud liquid water (g/Kg)

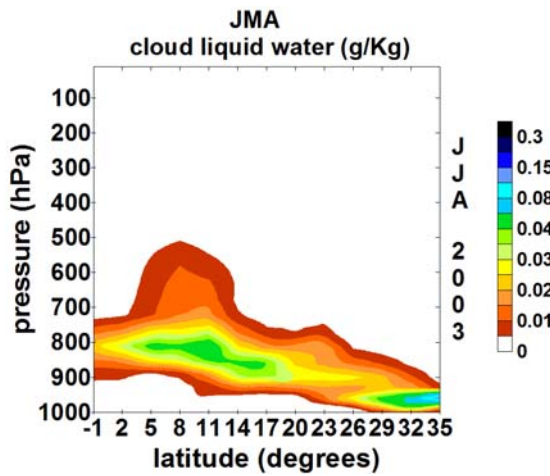






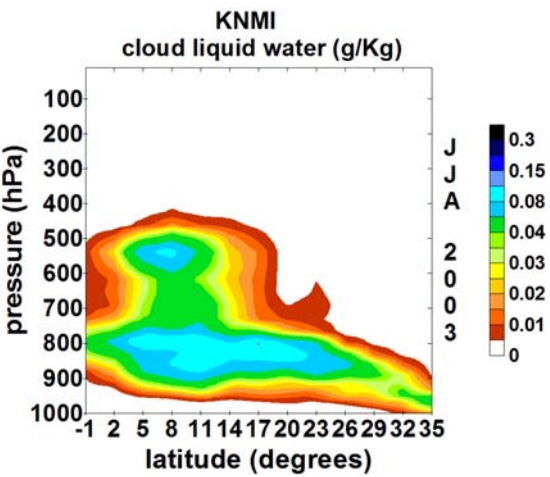


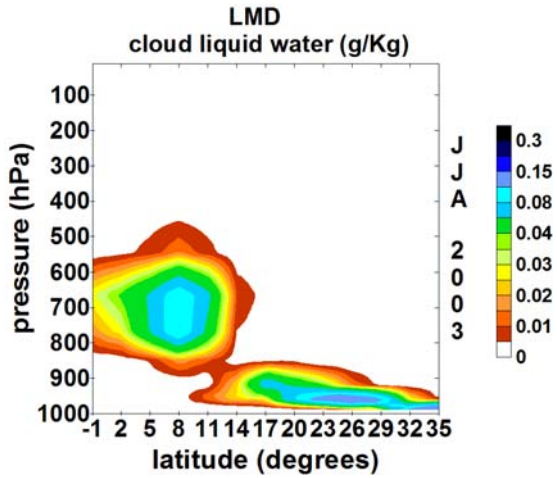


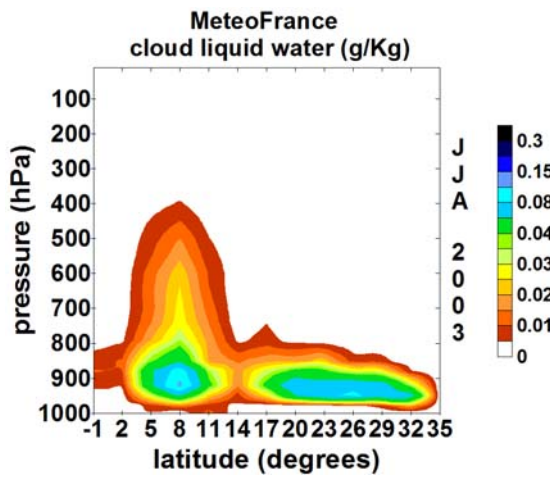


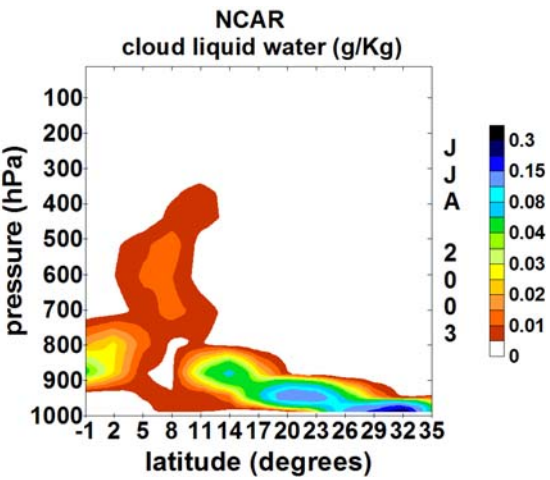
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

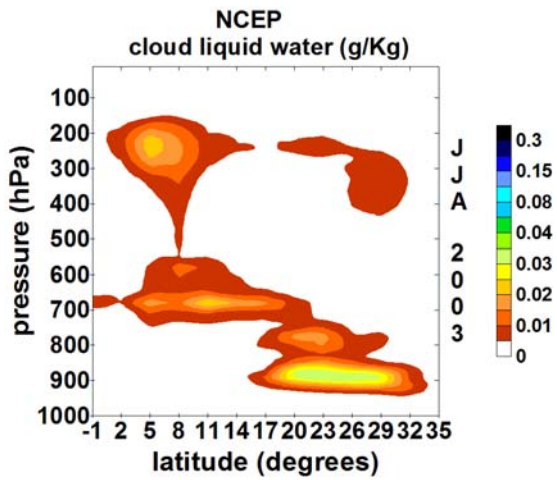
JJA 2003 mean vertical profiles. cloud liquid water (g/Kg)

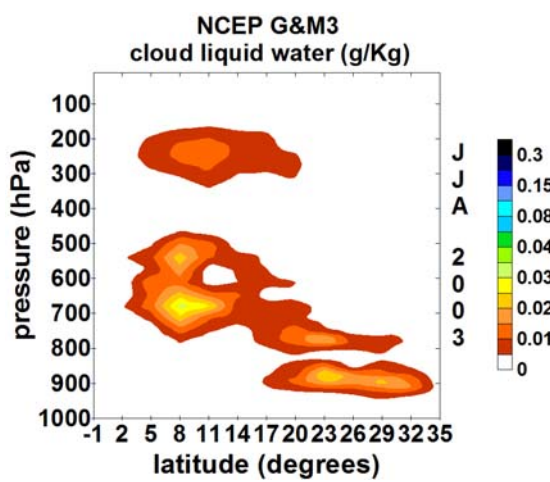






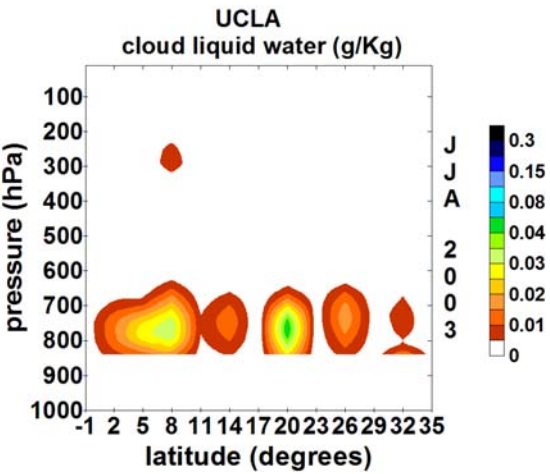


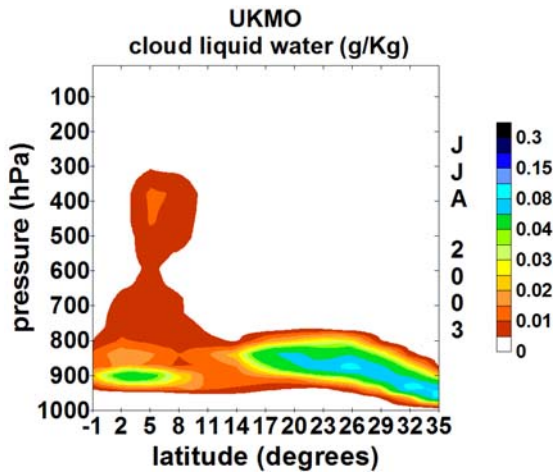


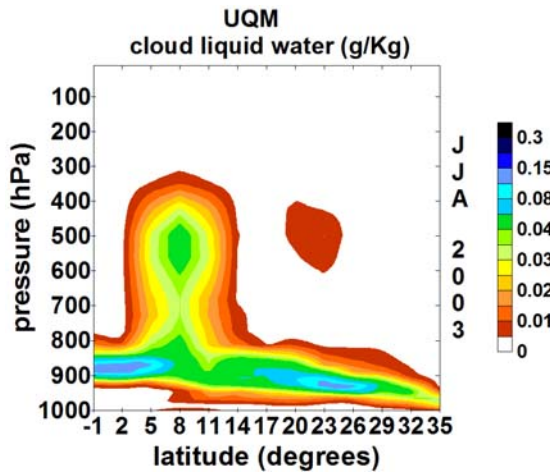


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 2003 mean vertical profiles. cloud liquid water (g/Kg)

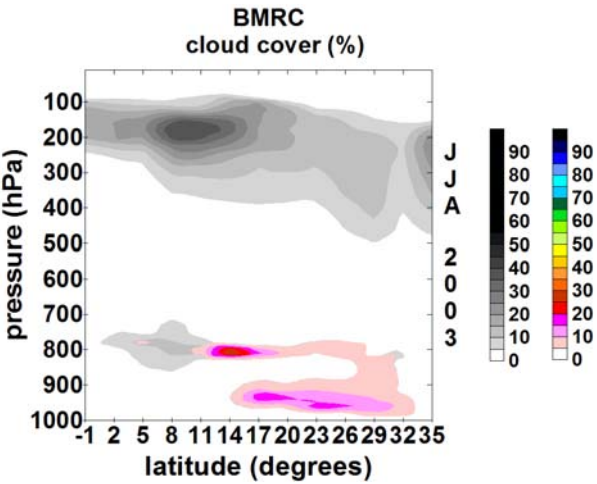


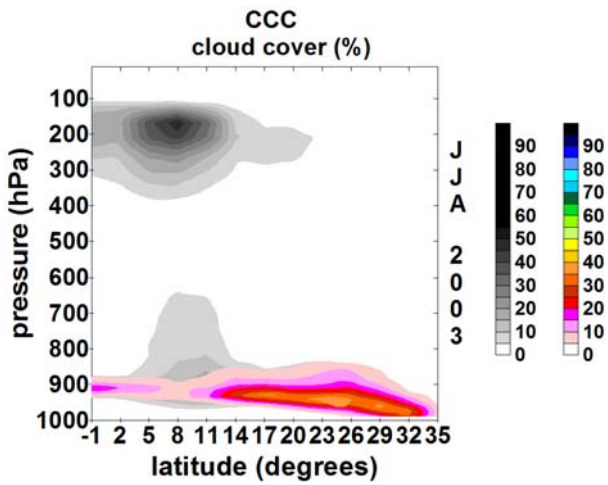


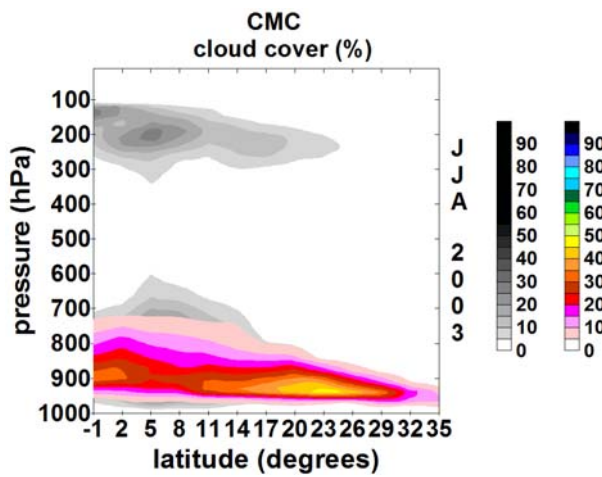


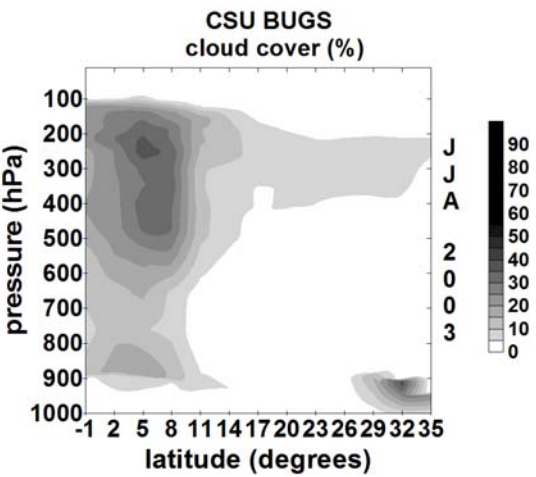
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

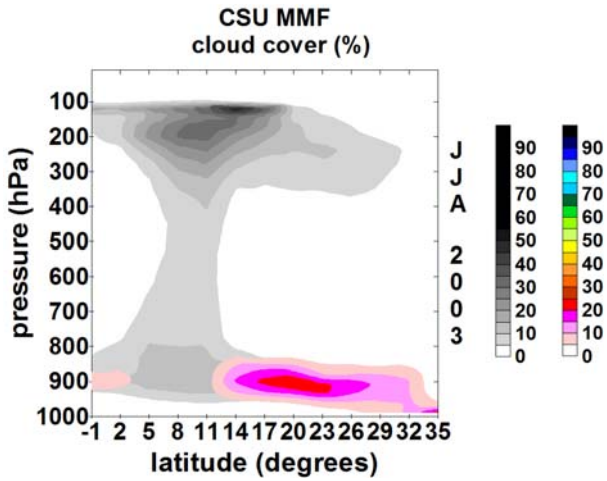
JJA 2003 mean vertical profiles. cloud cover (%)

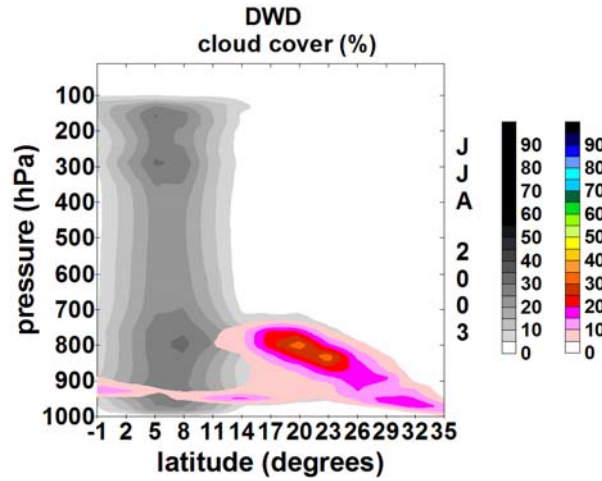






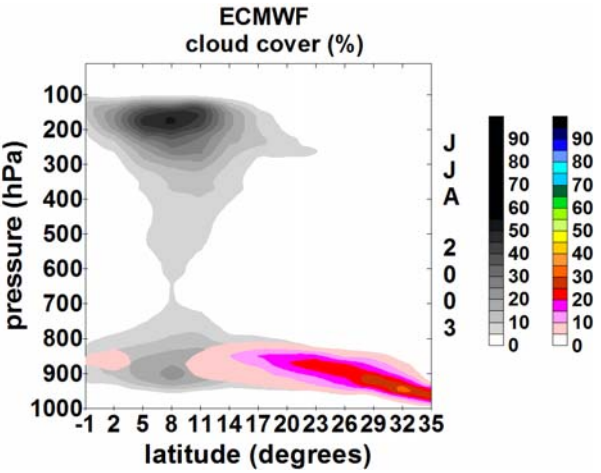


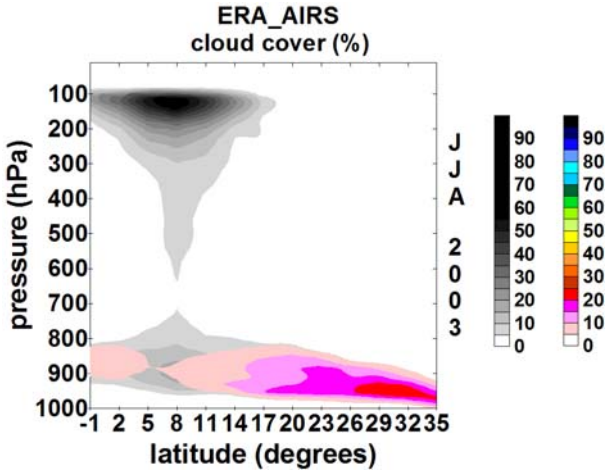


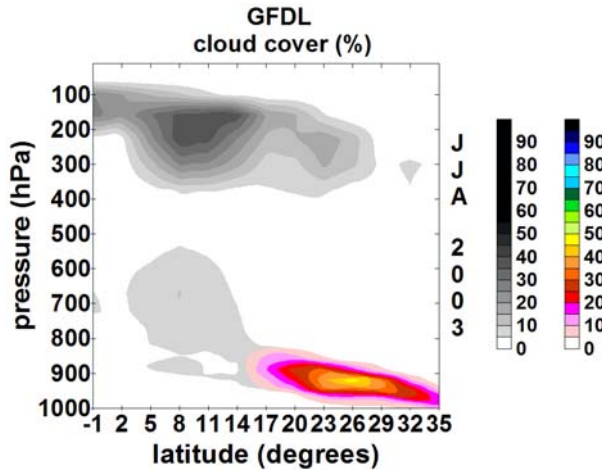


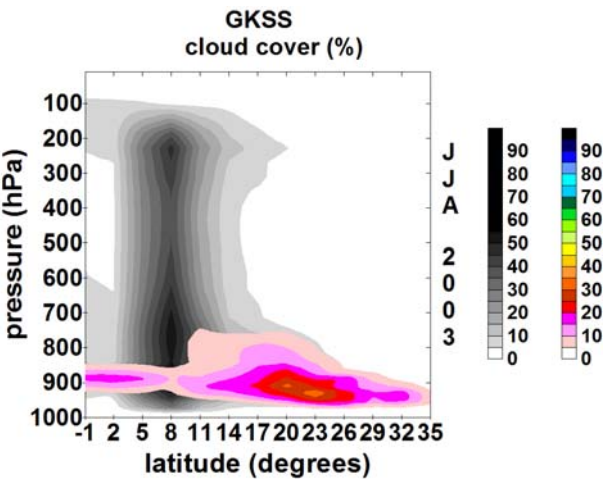
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

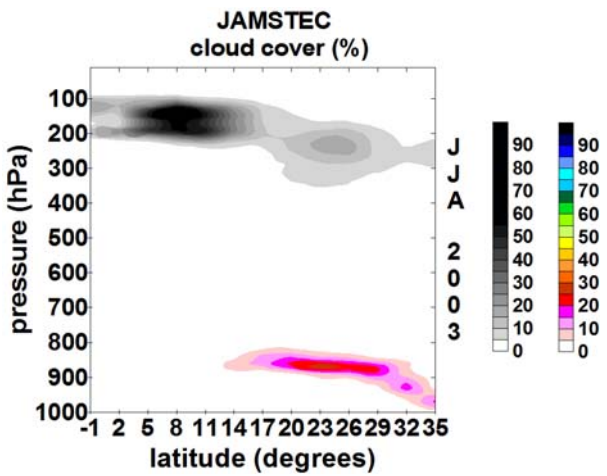
JJA 2003 mean vertical profiles. cloud cover (%)

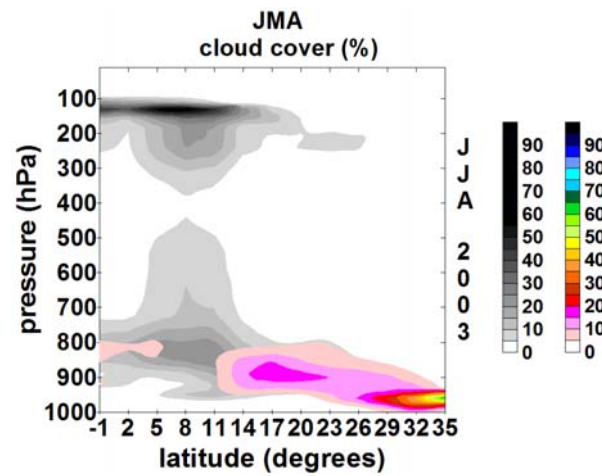






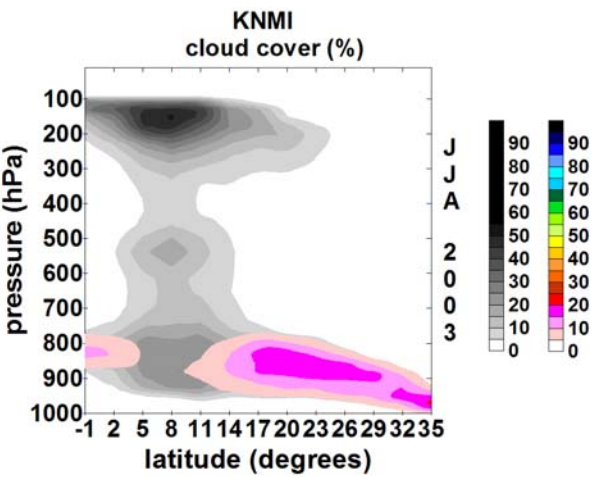


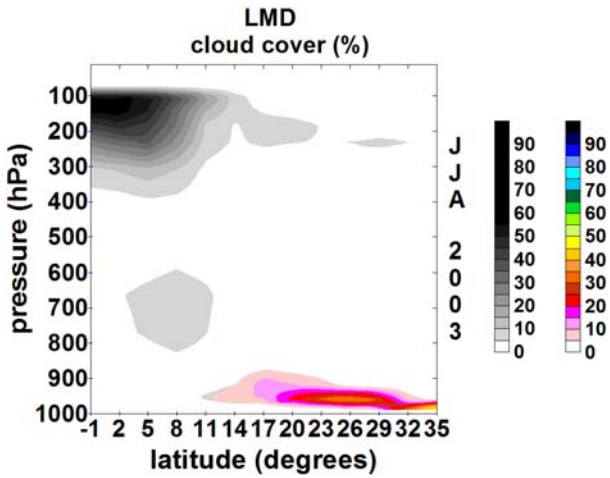


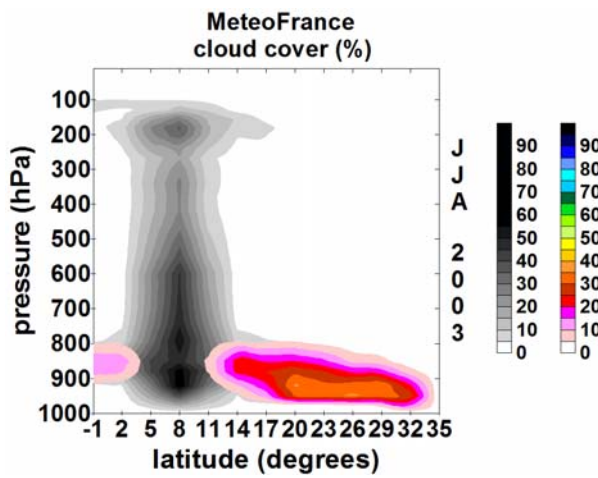


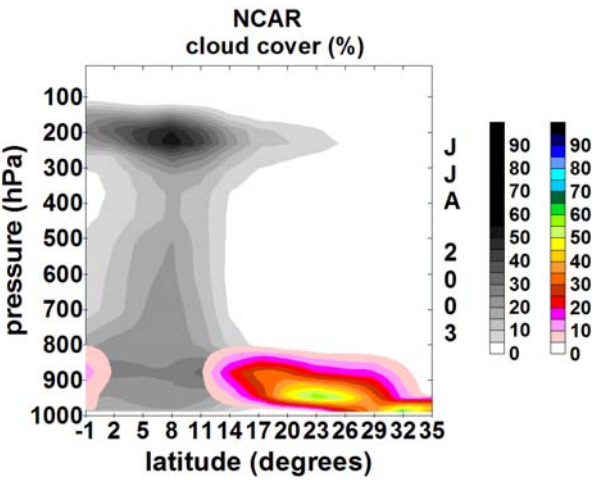
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

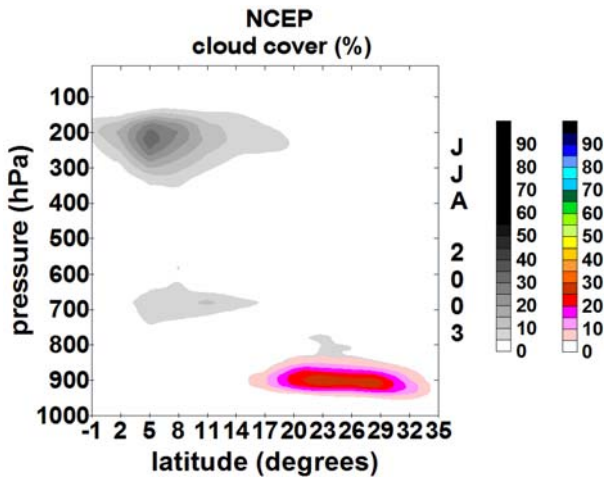
JJA 2003 mean vertical profiles. cloud cover (%)

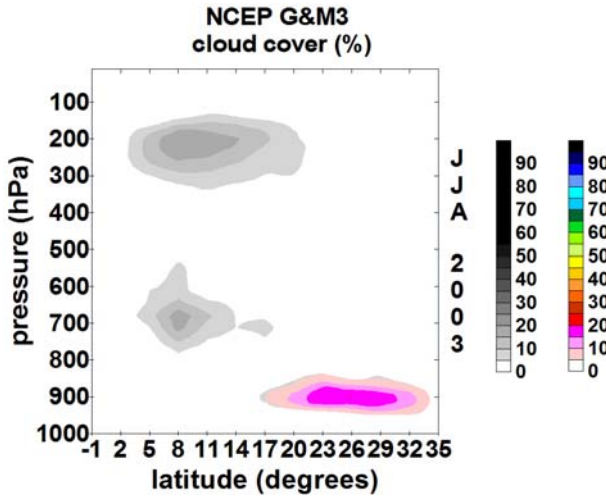






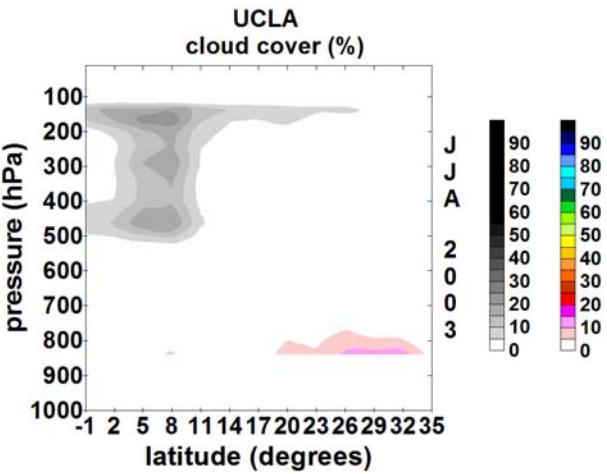


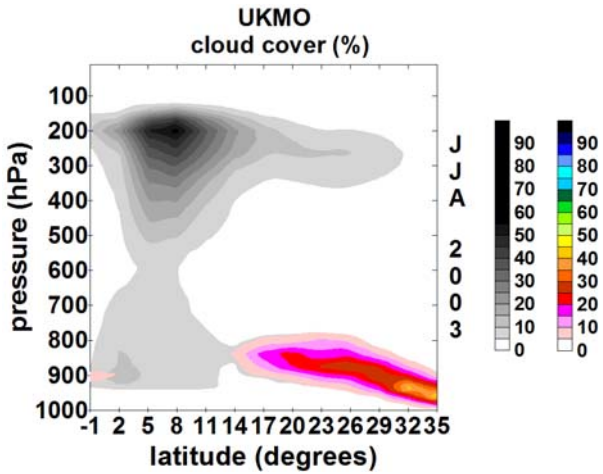


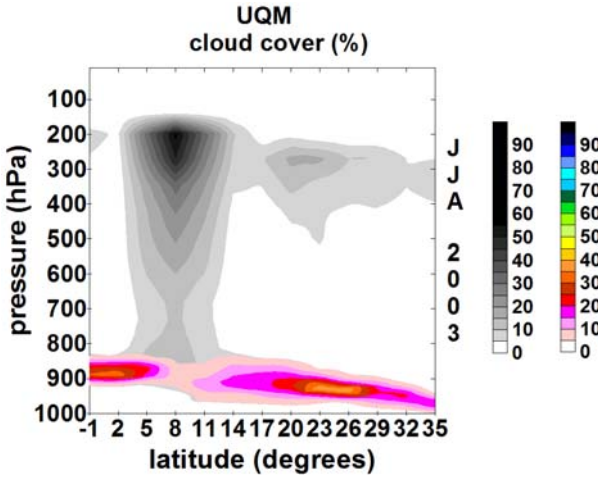


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 2003 mean vertical profiles. cloud cover (%)

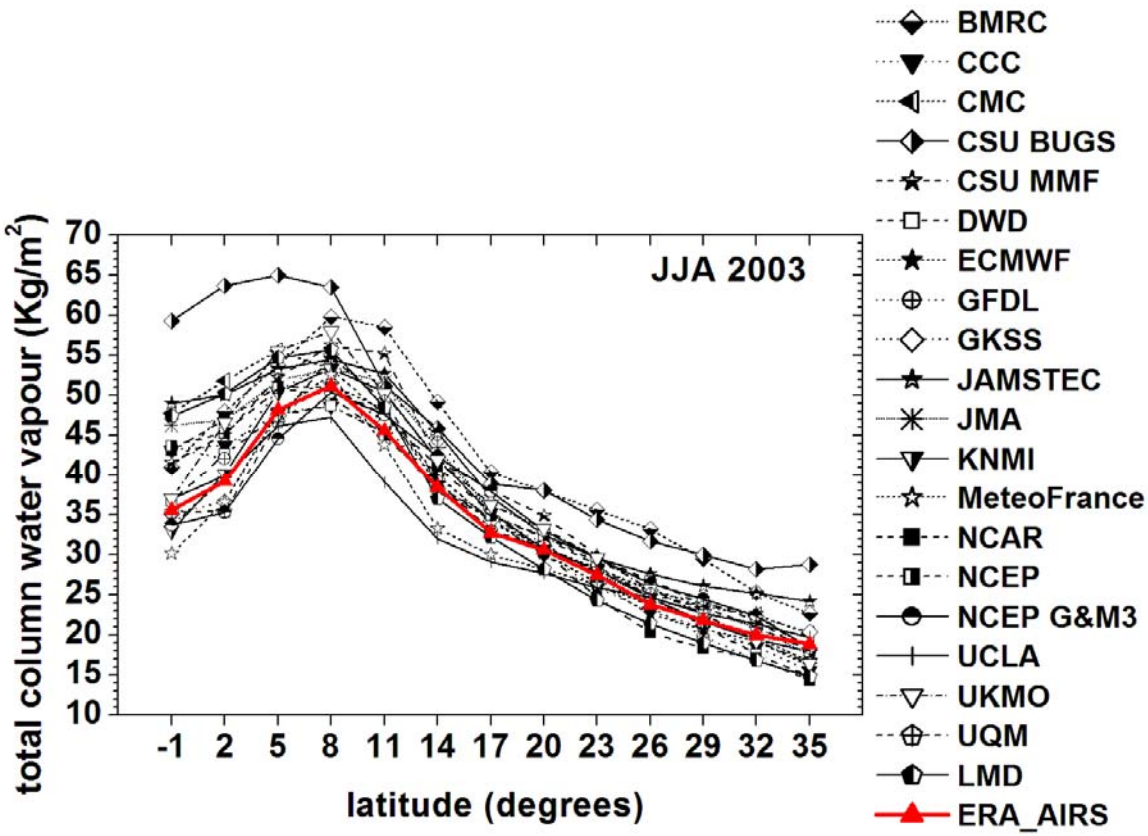






GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 2003 mean sections for single-level parameters.



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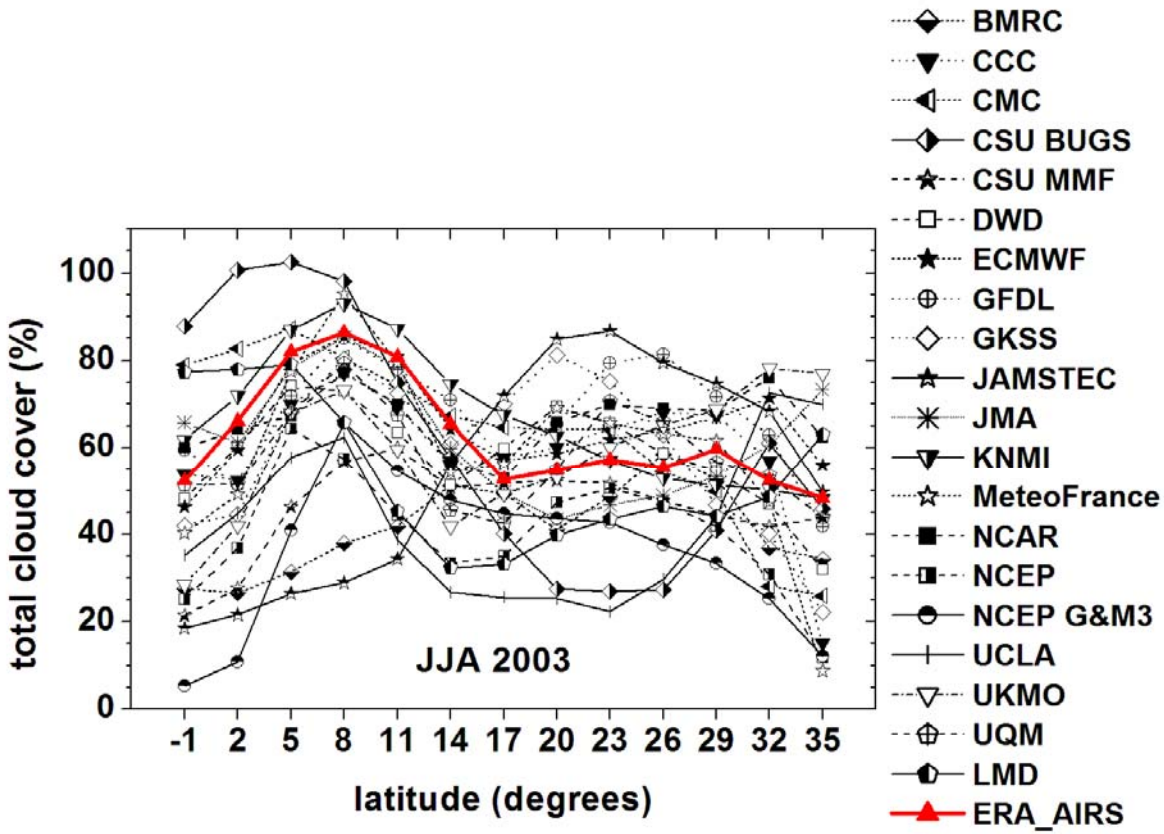

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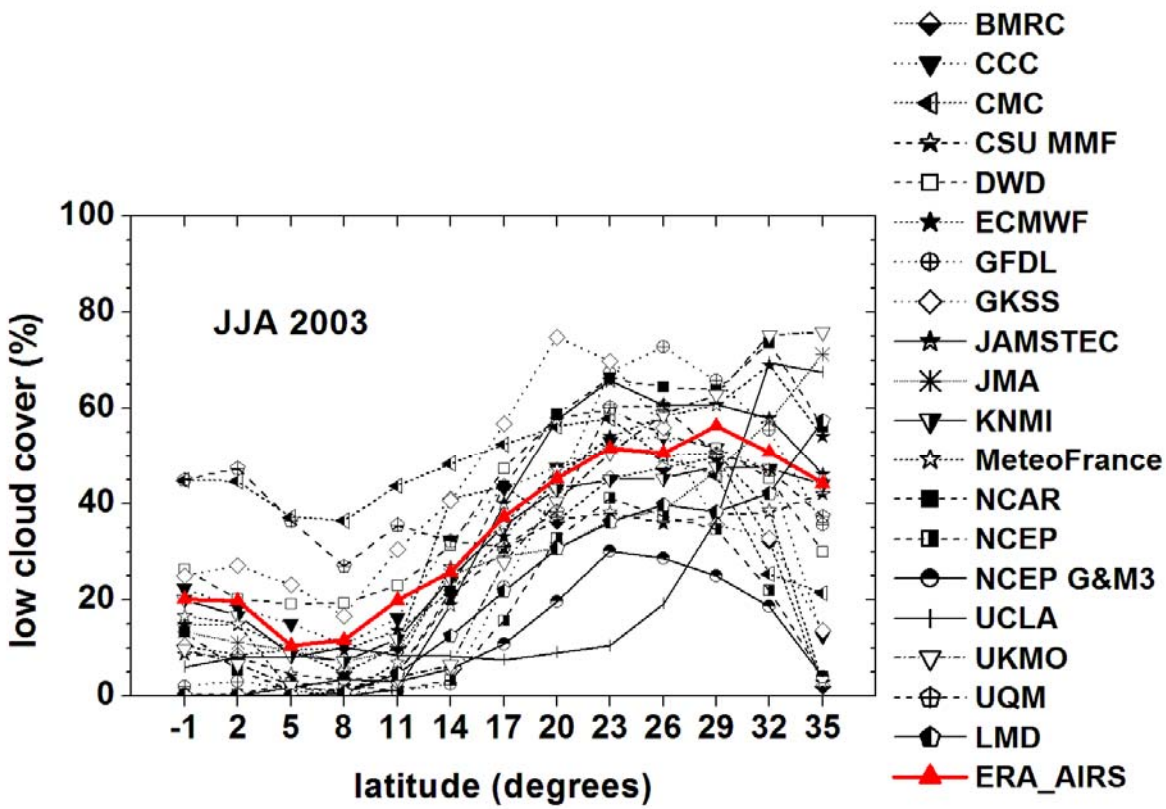

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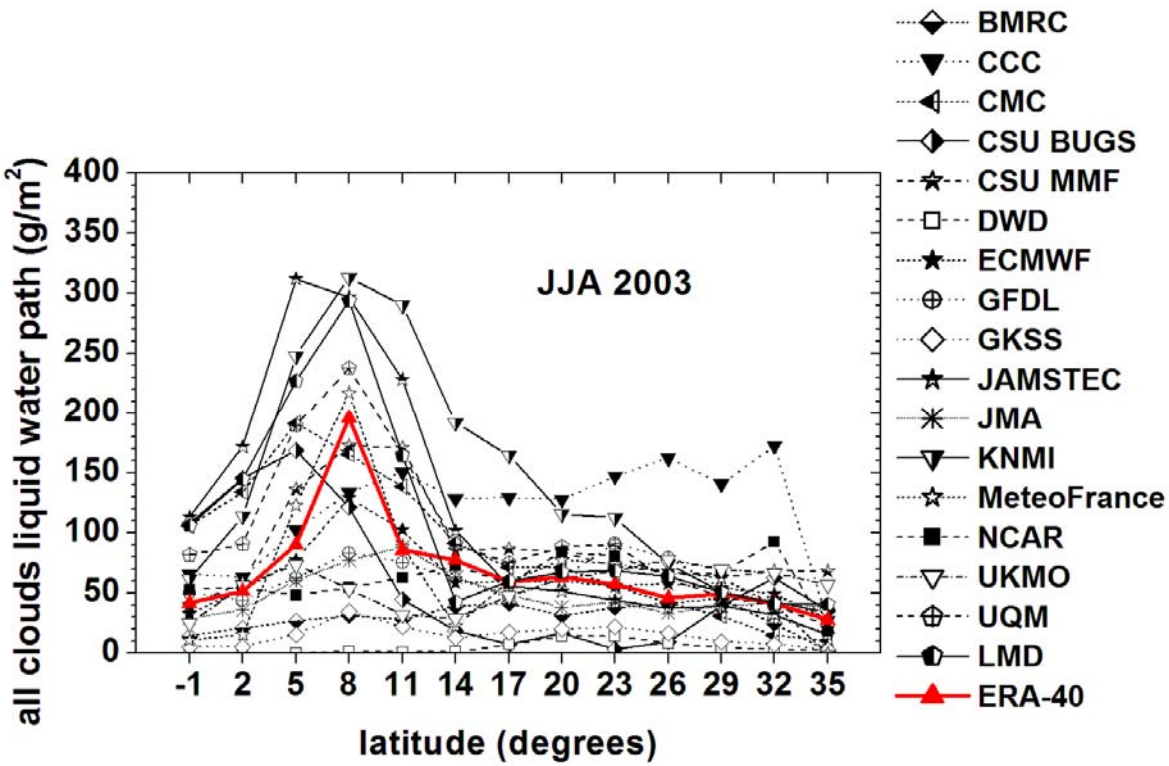

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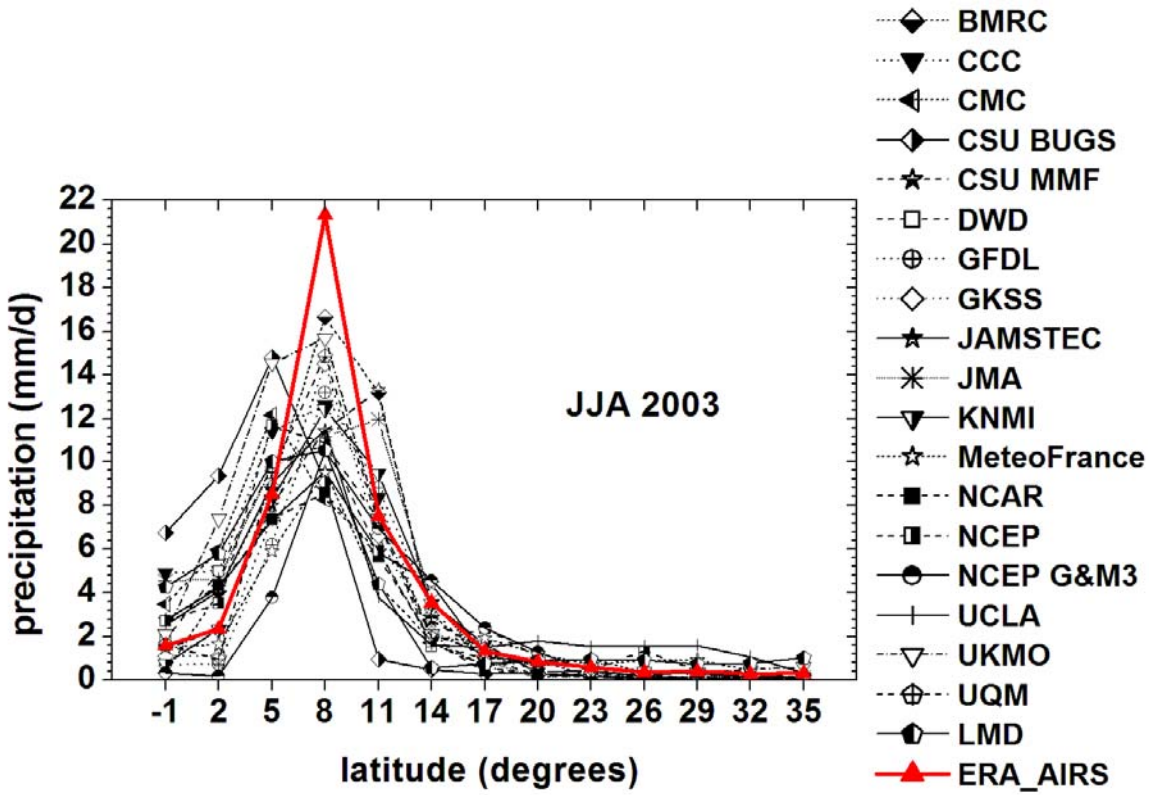

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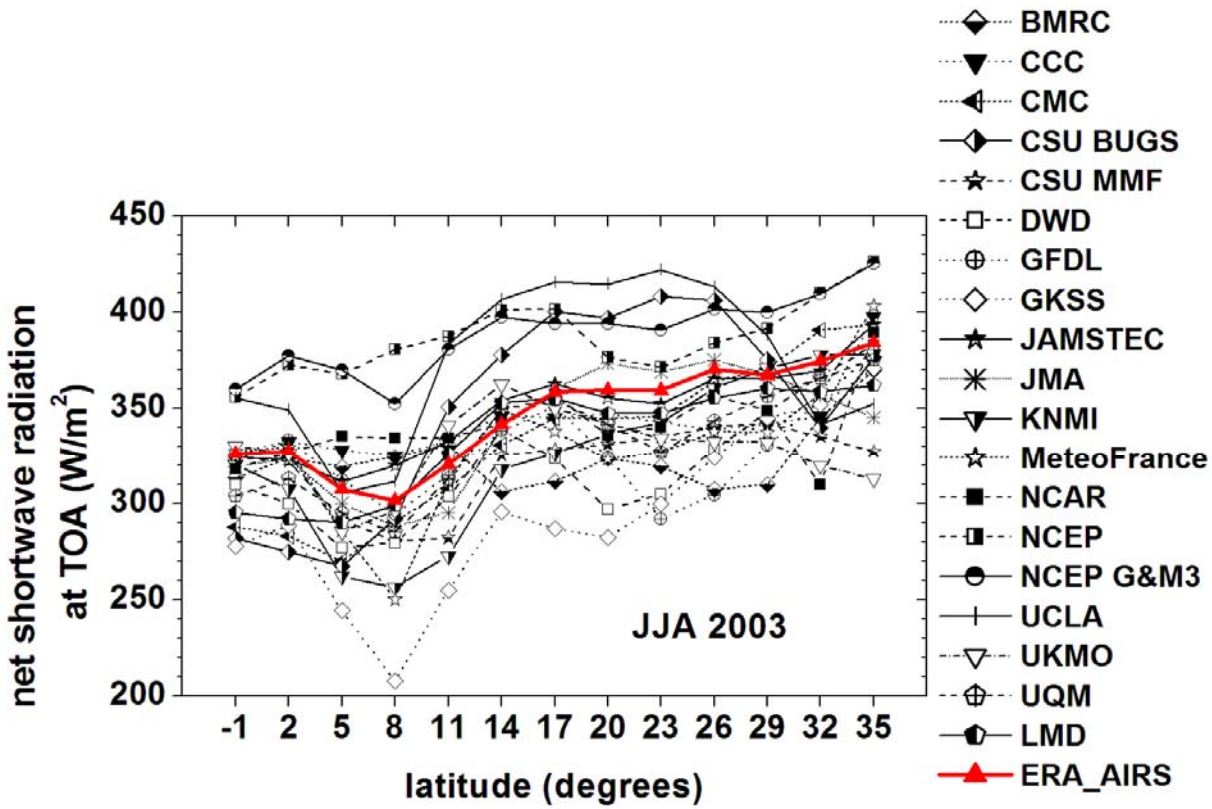

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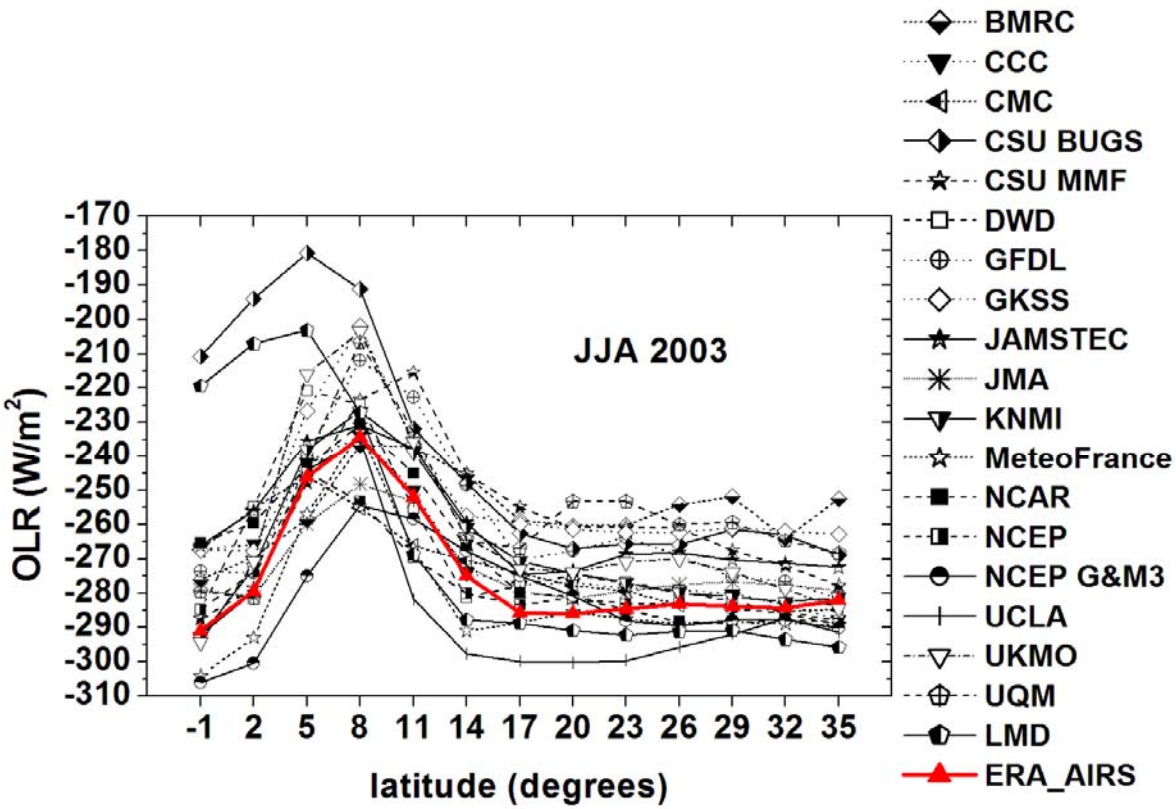

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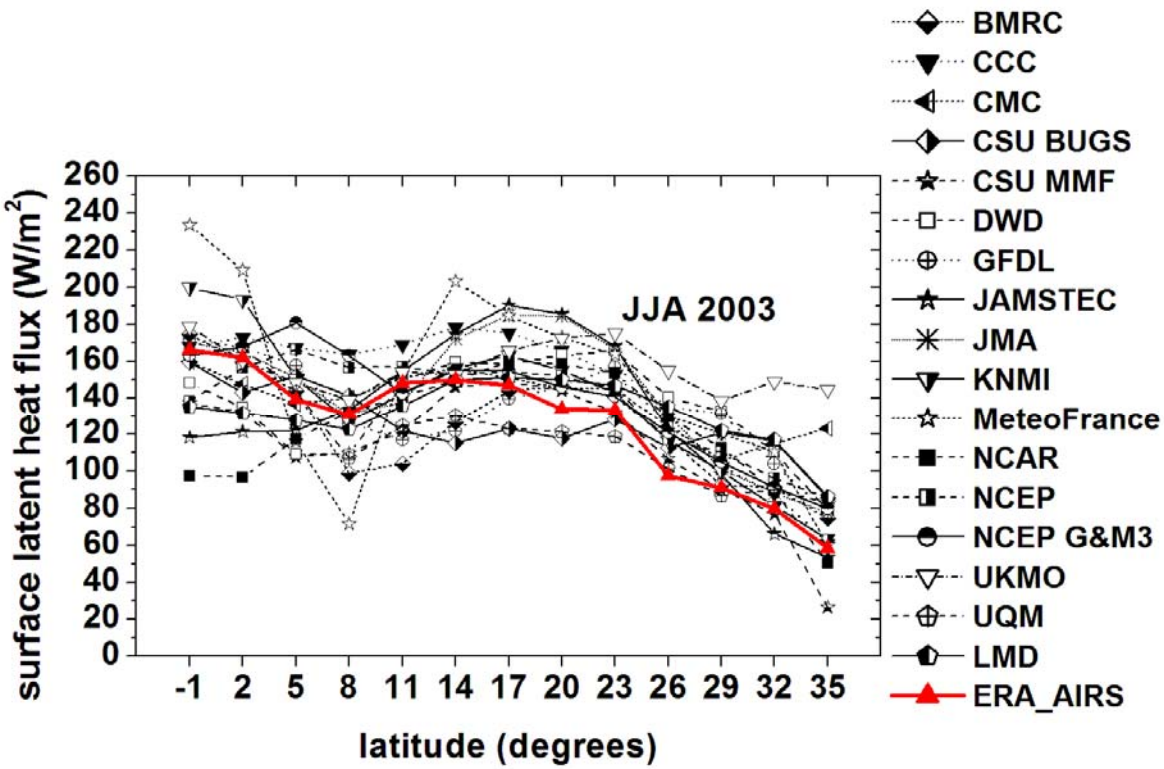
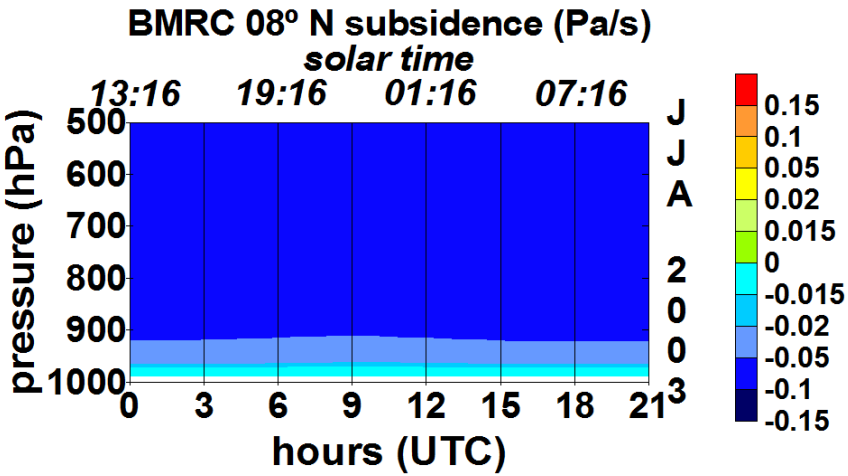
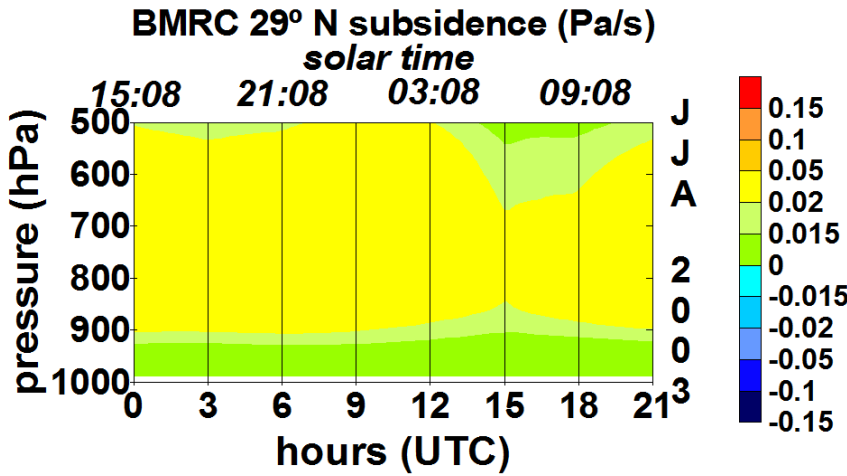
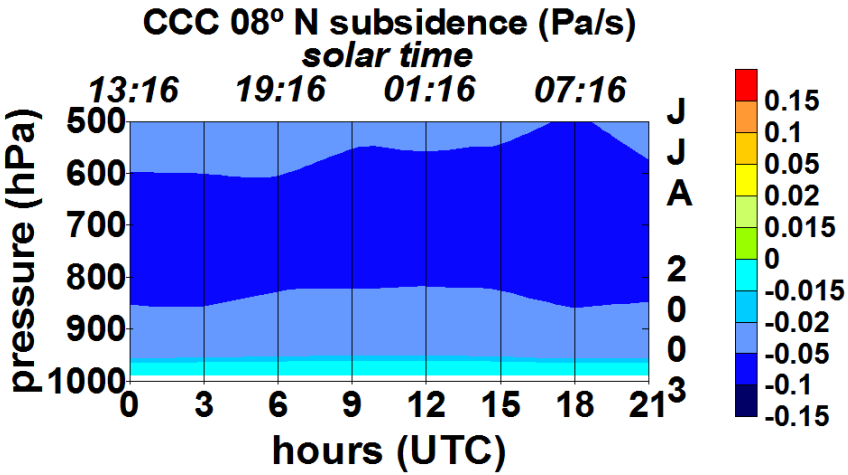


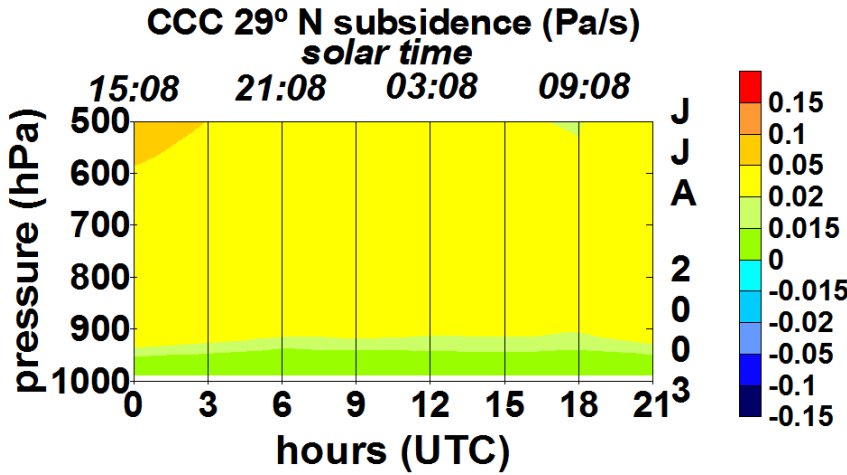
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 2003 mean diurnal cycle: subsidence.









GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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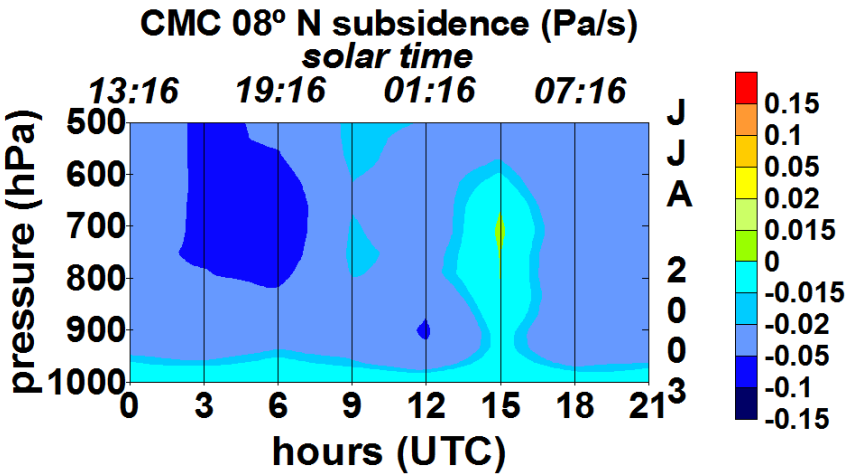

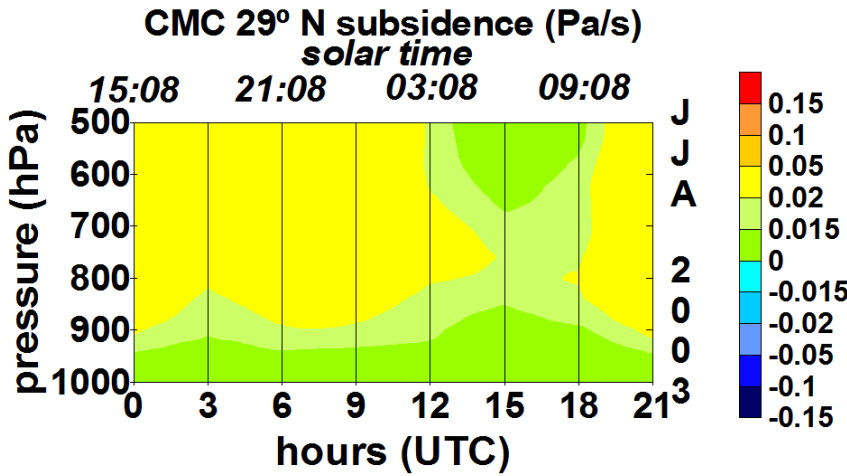

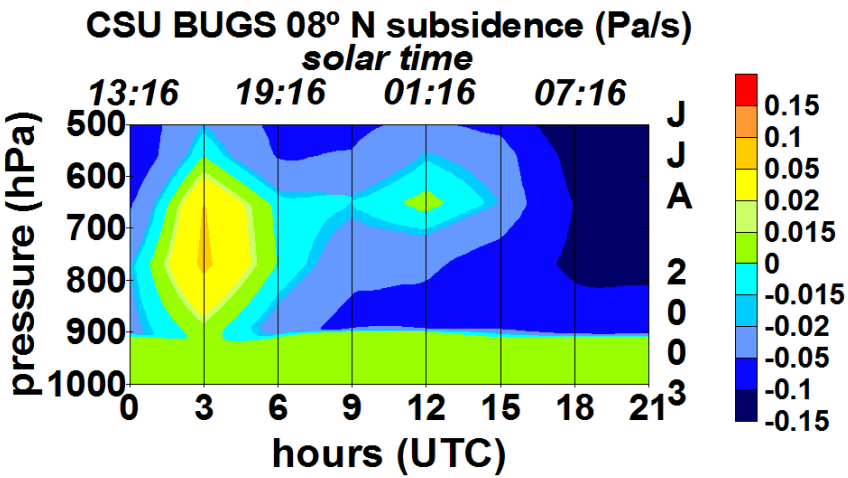

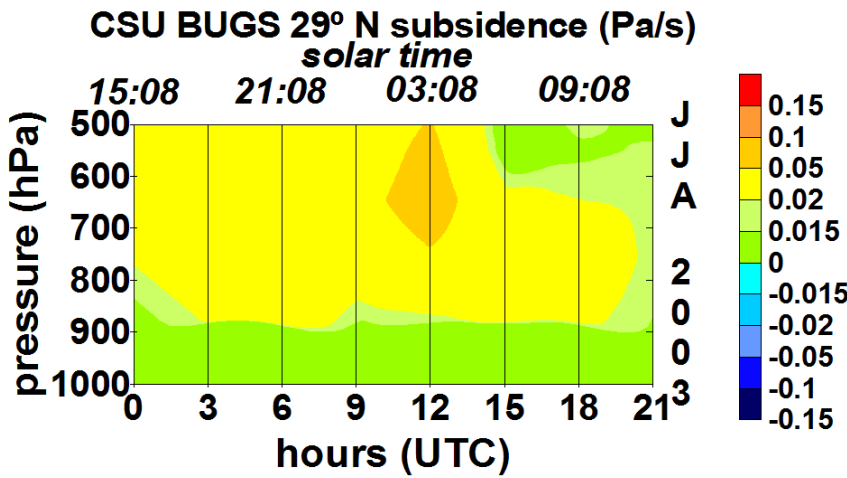

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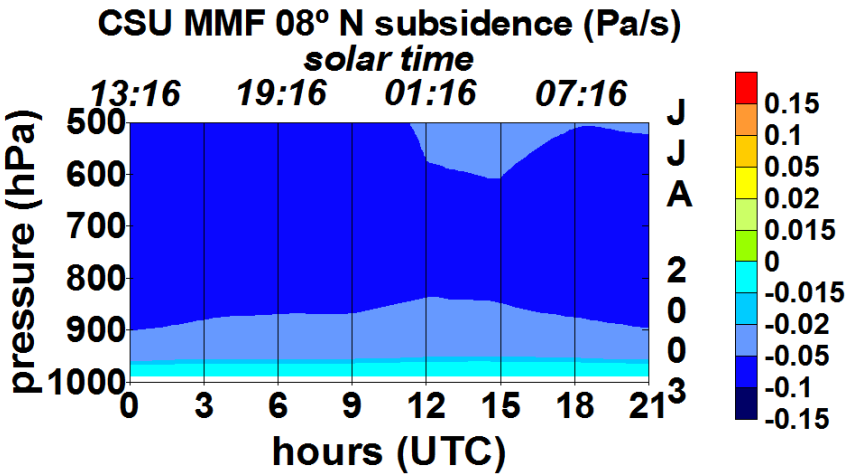

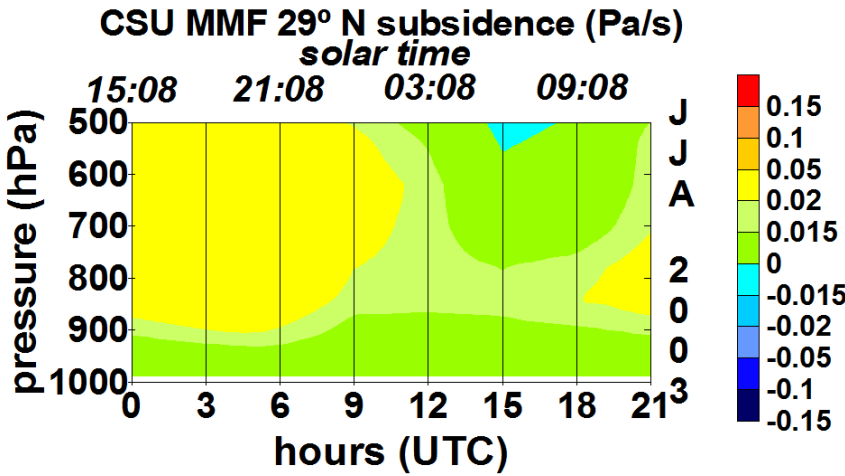

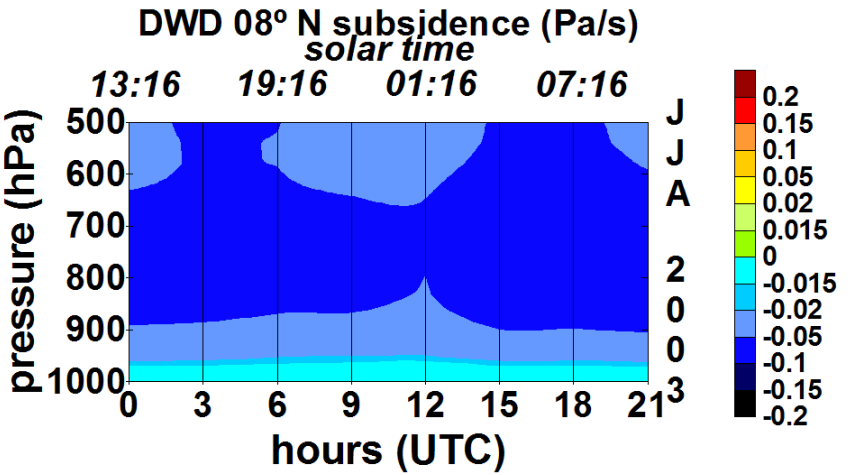

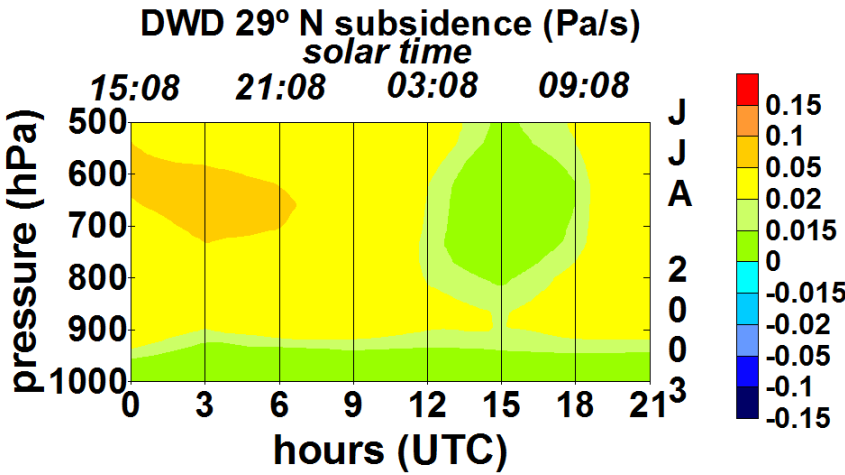

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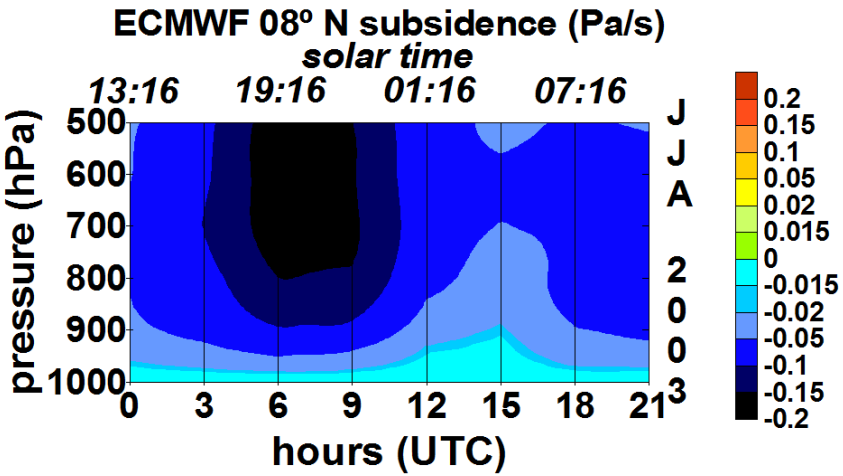

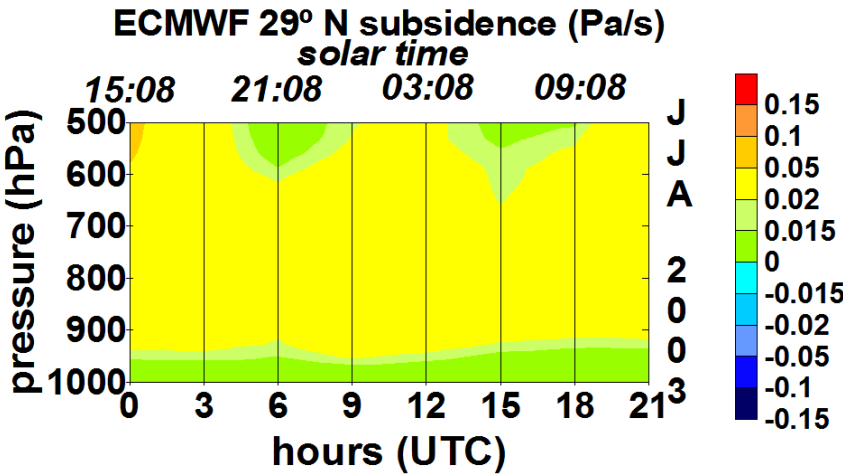

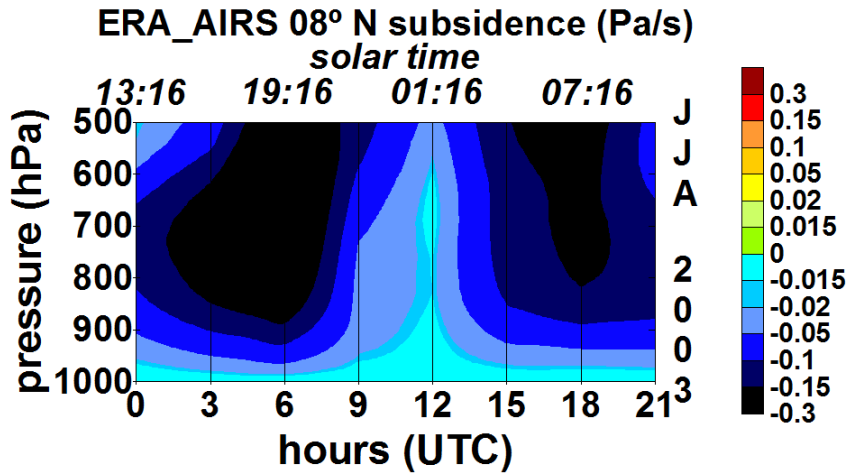

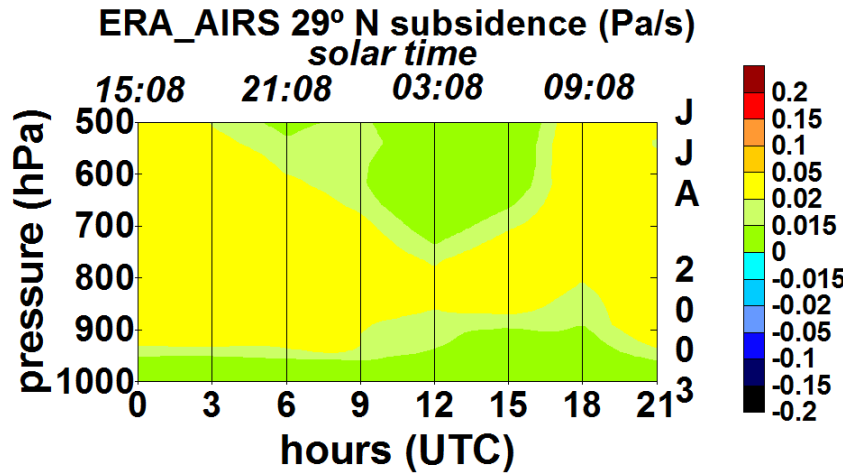

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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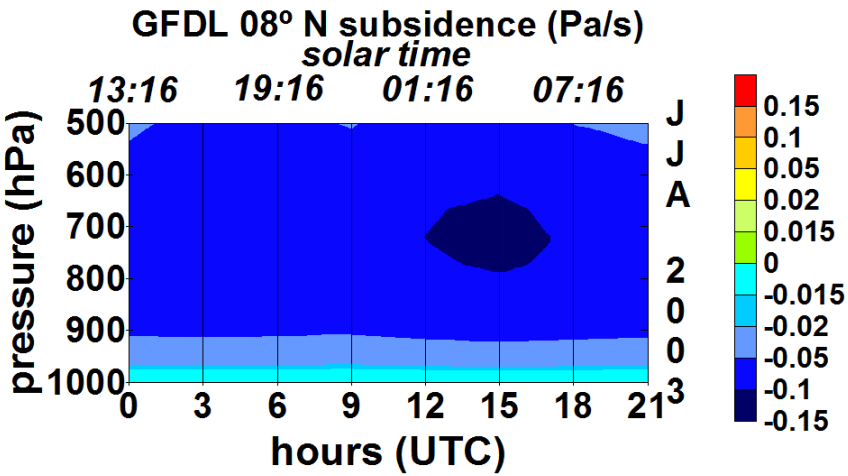

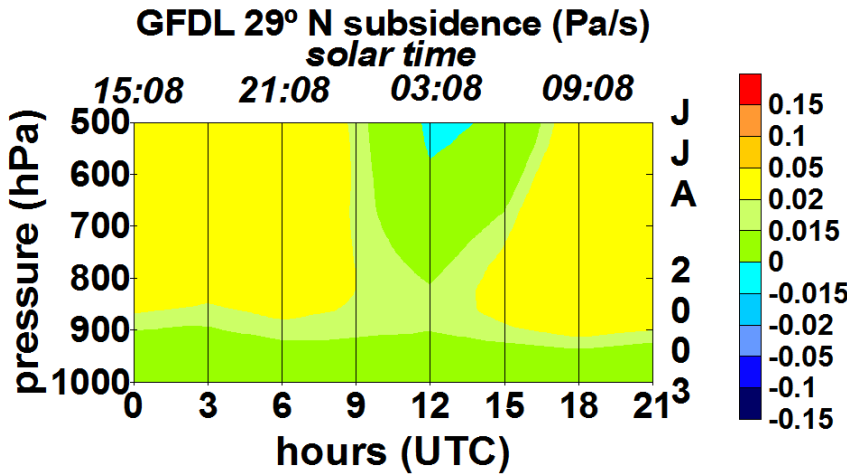

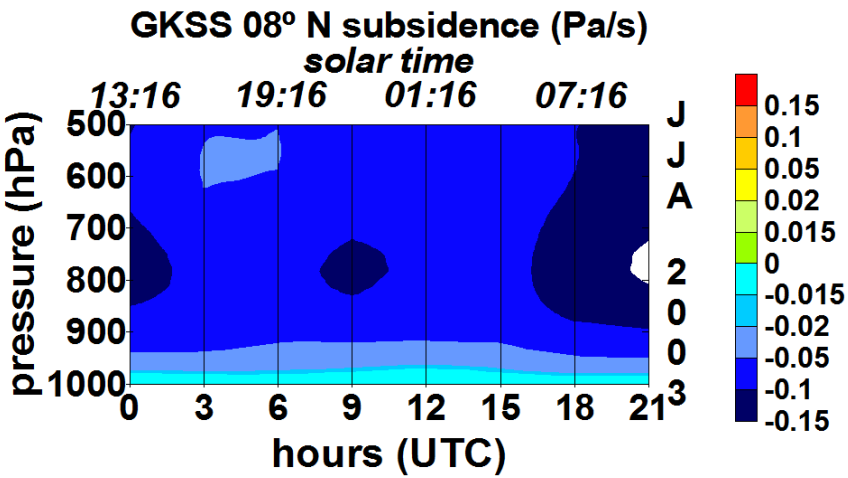

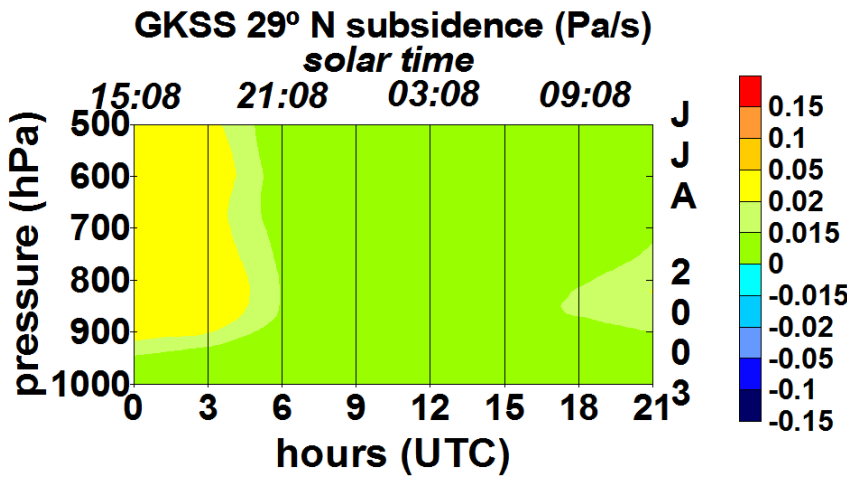

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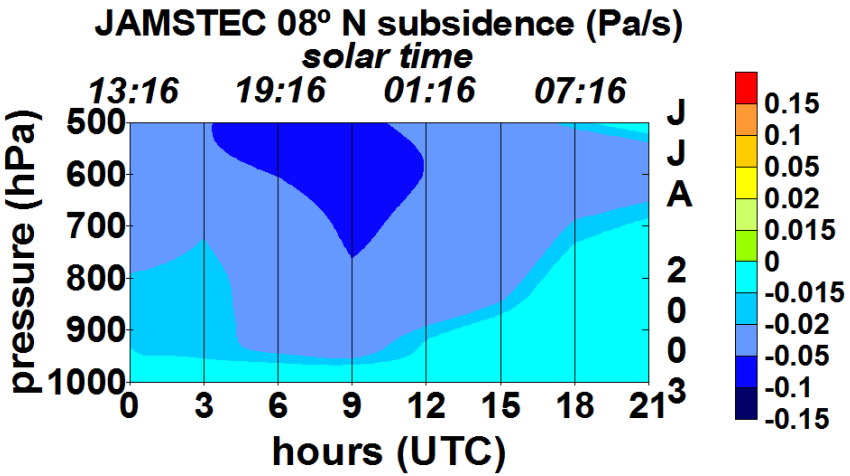

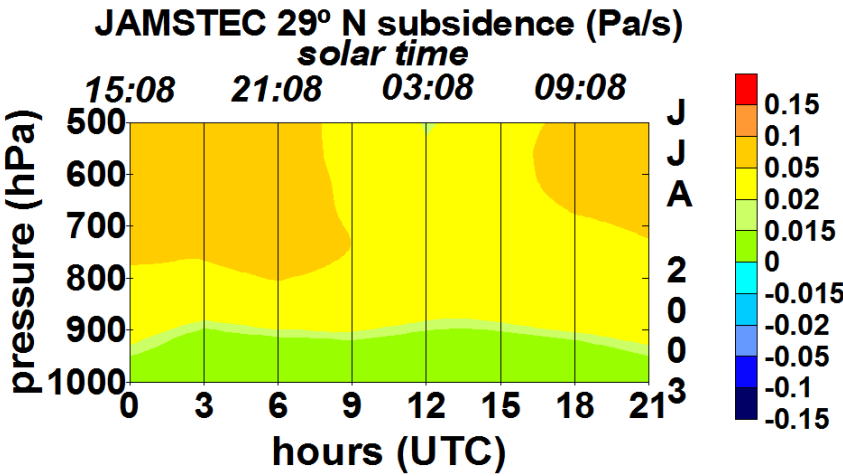

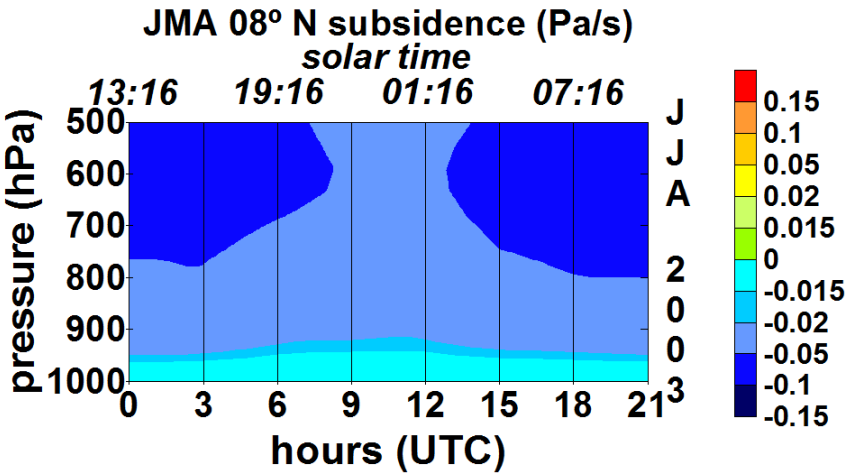

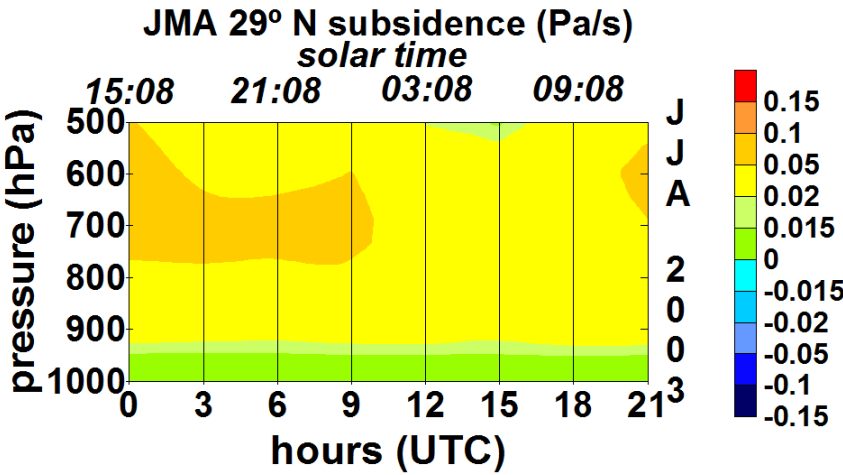

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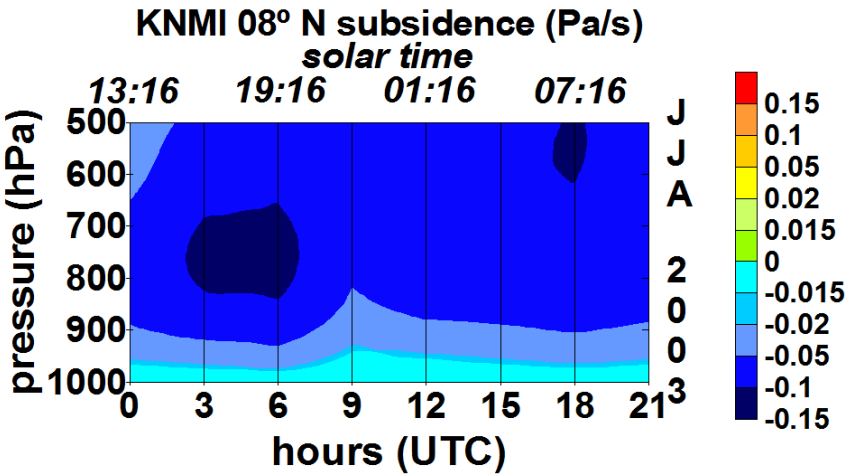

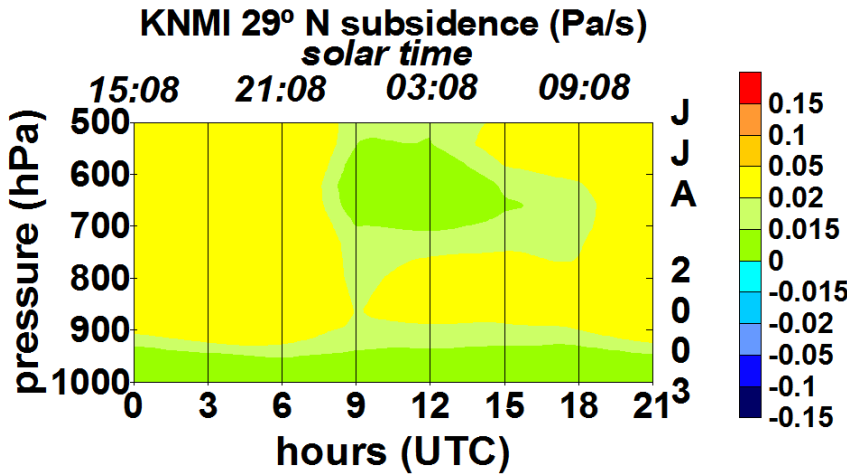

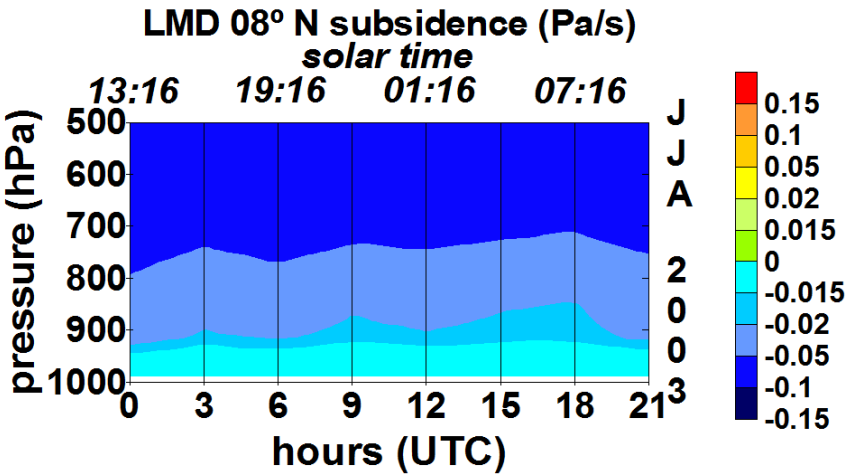

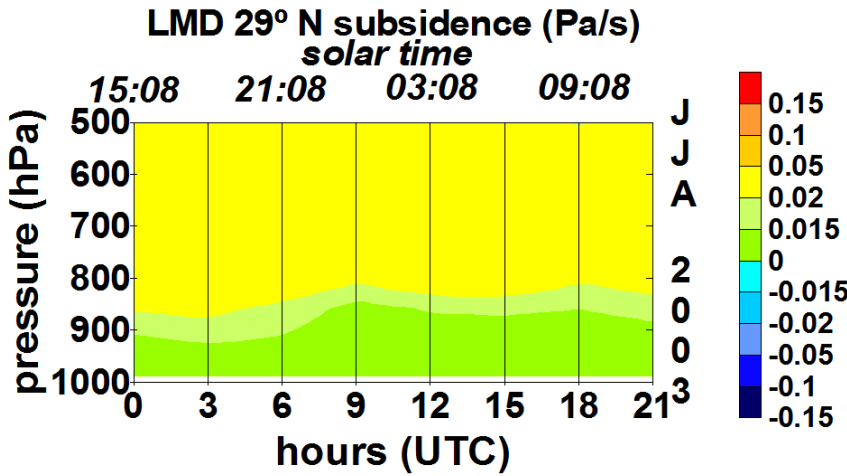

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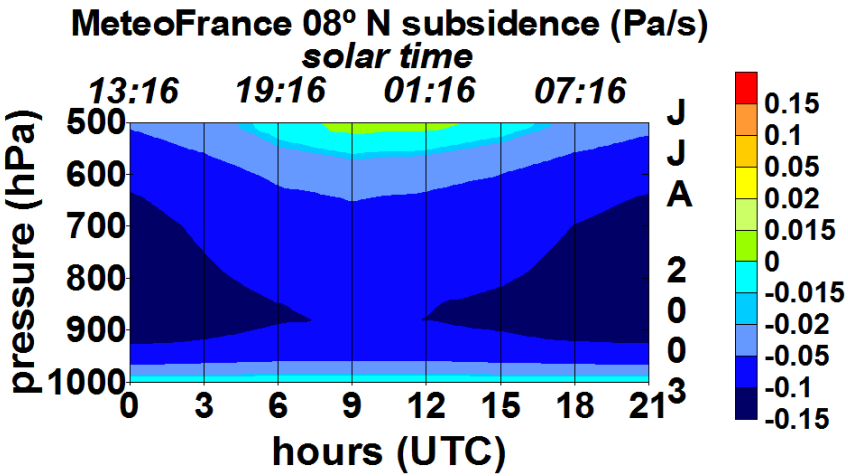

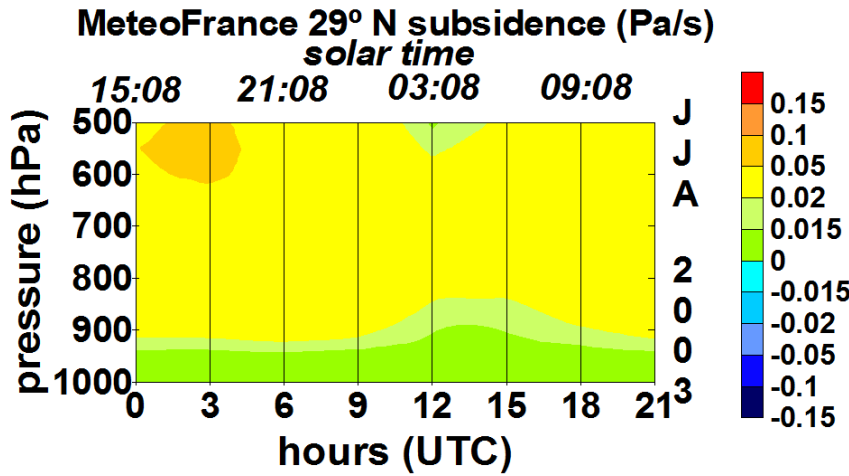

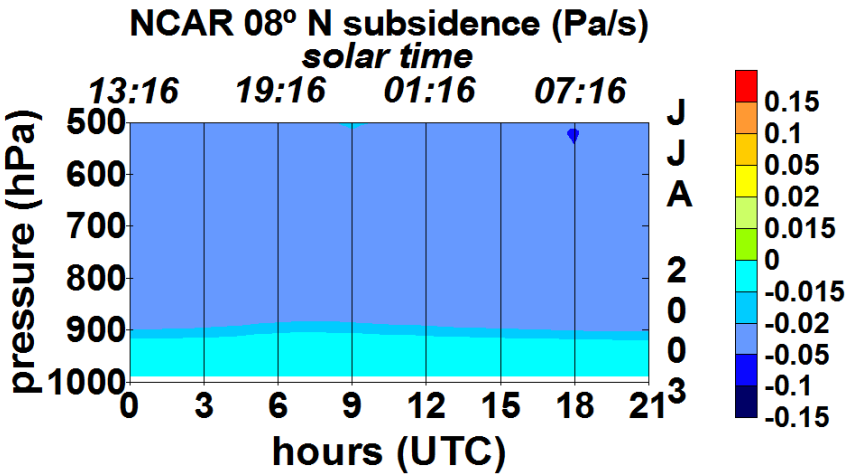

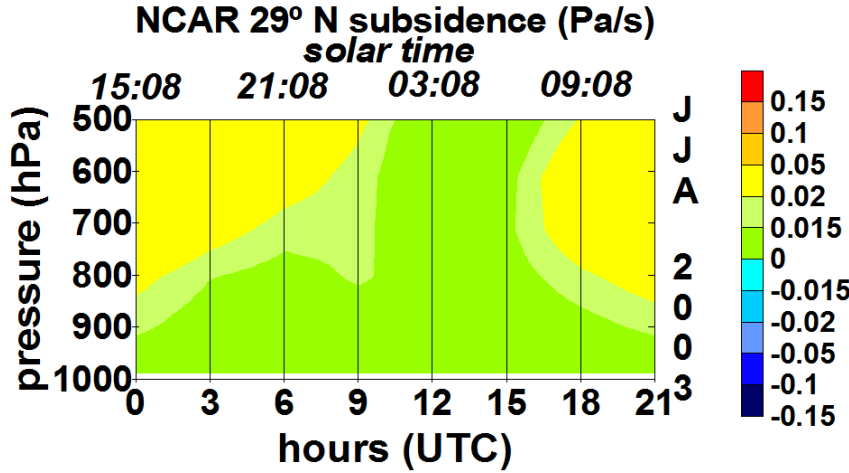

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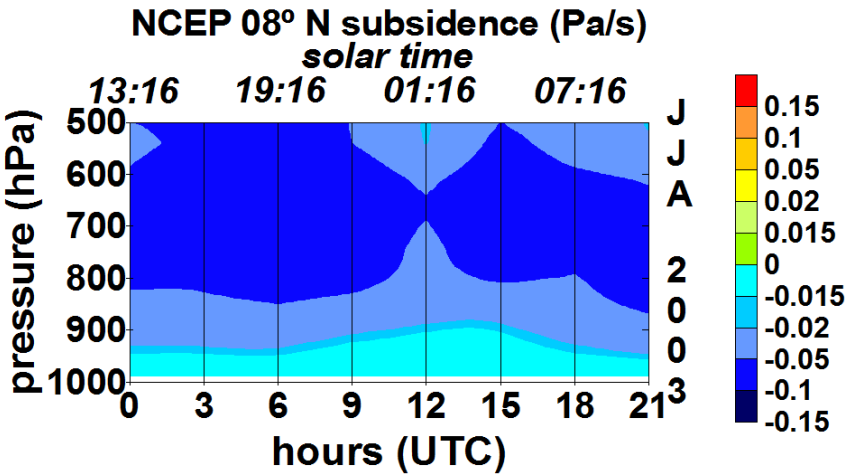

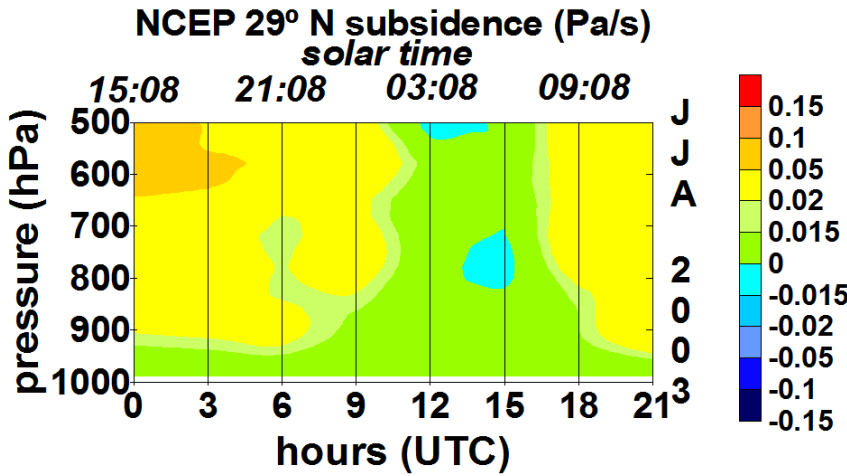

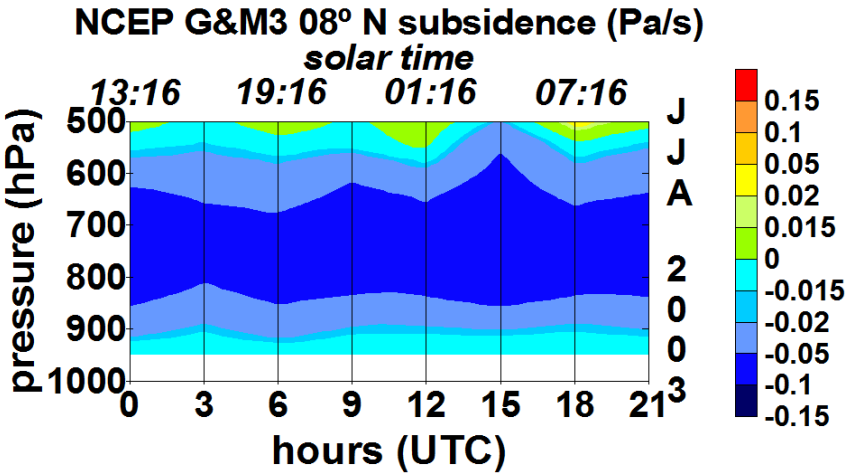

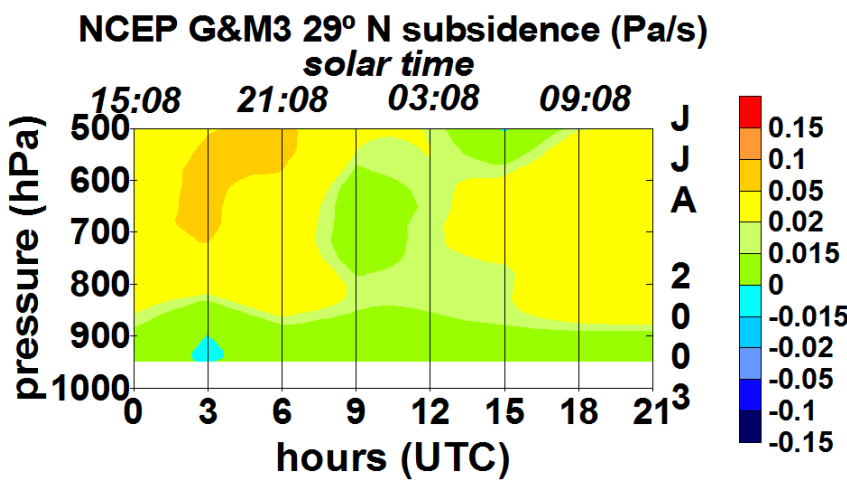

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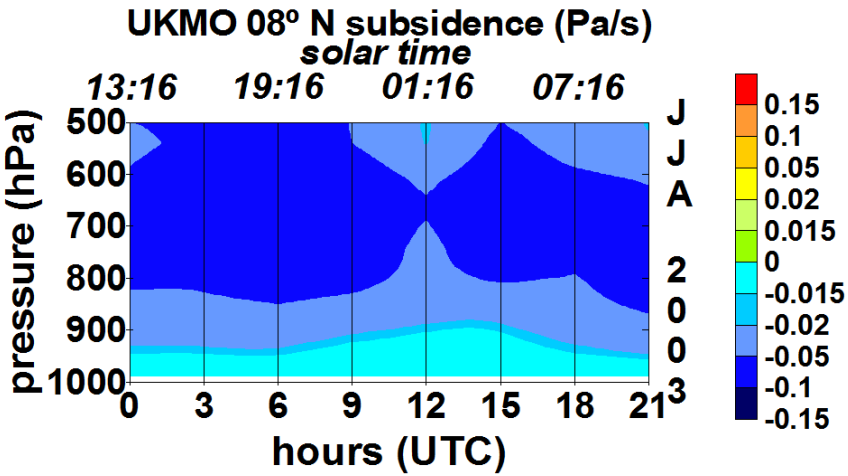
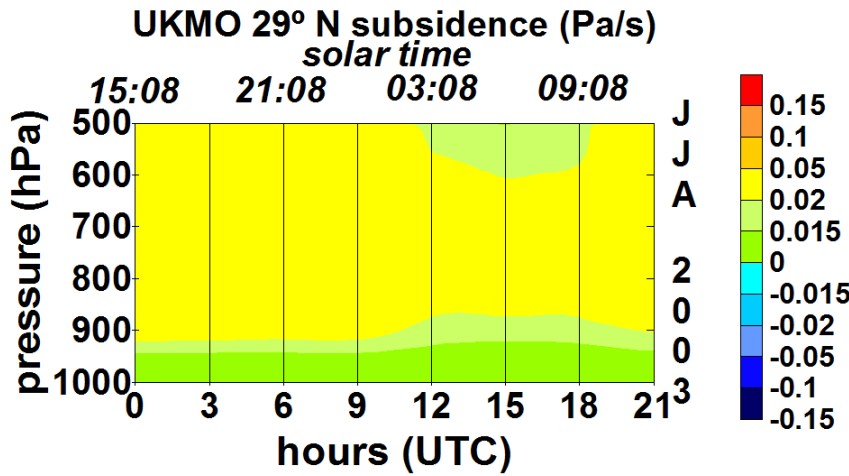
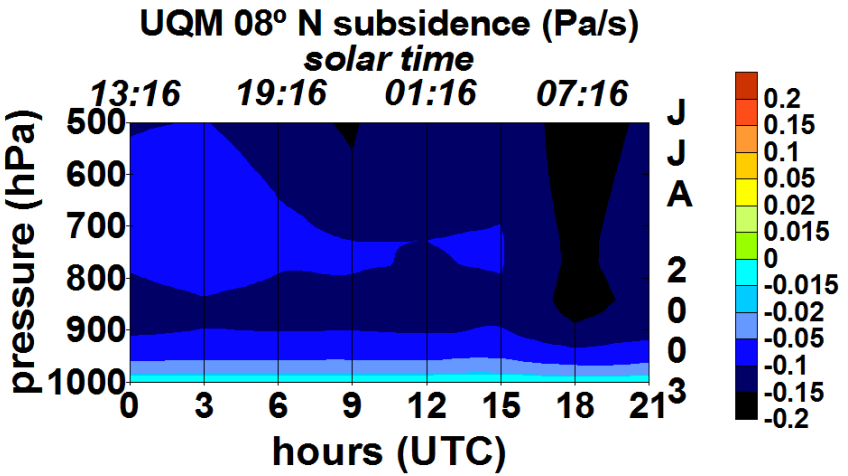
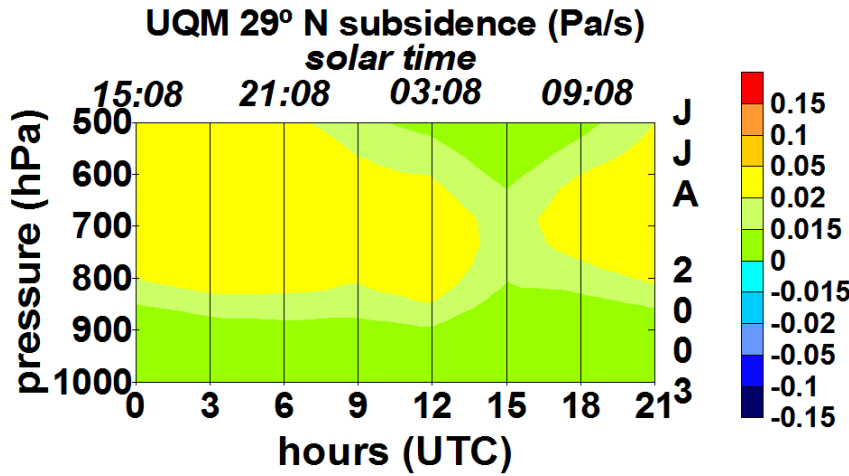


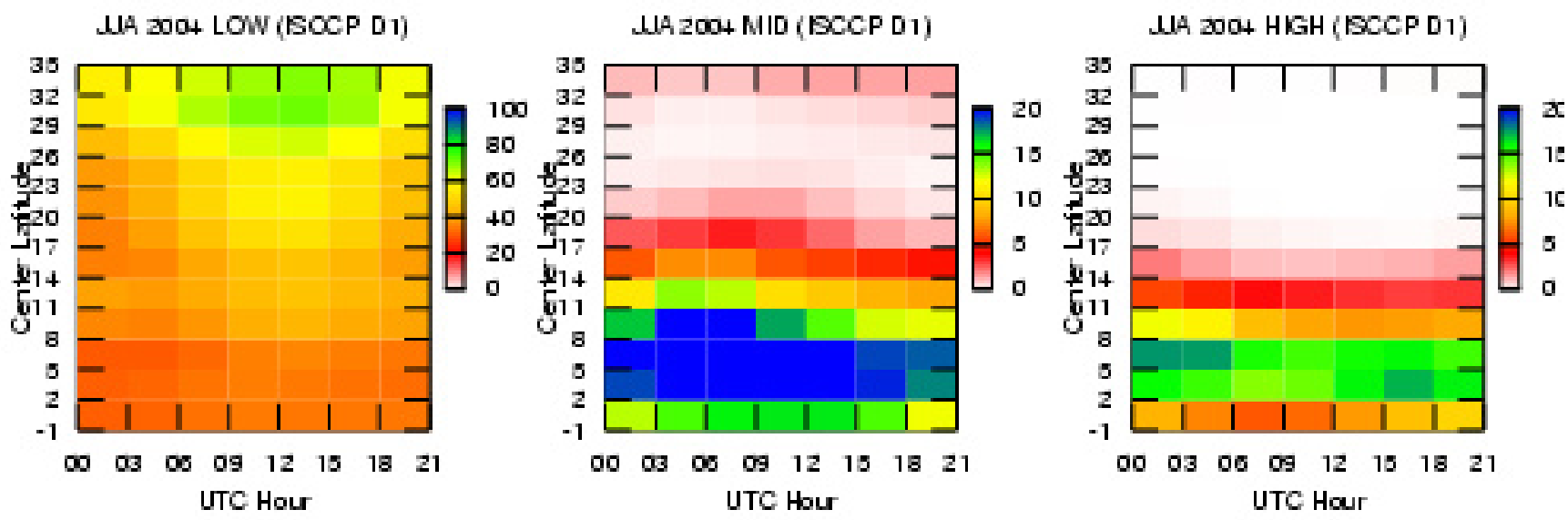






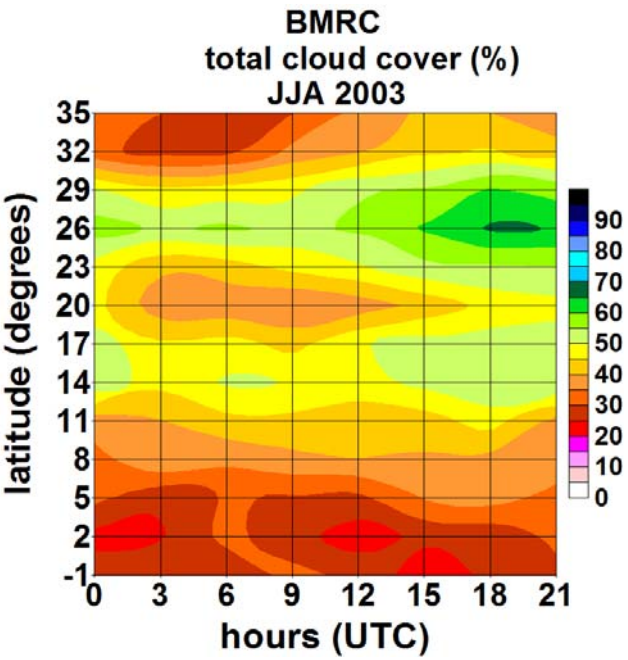
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

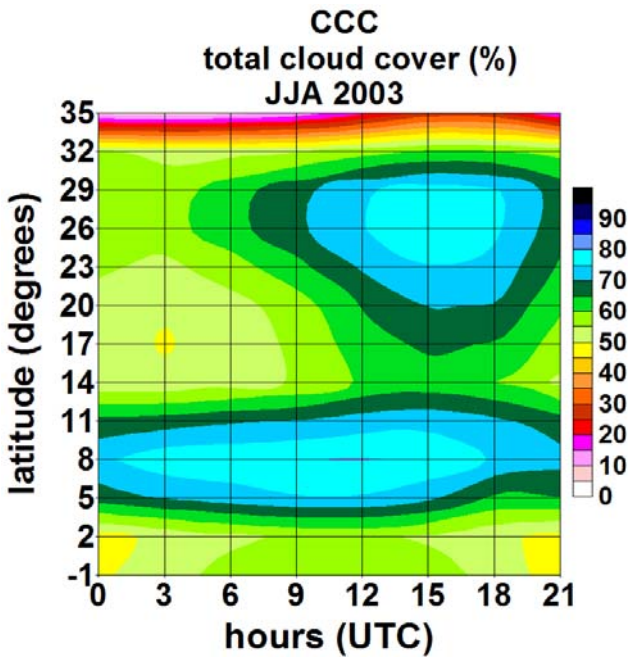
JJA 2003 mean diurnal cycle: total cloud cover.

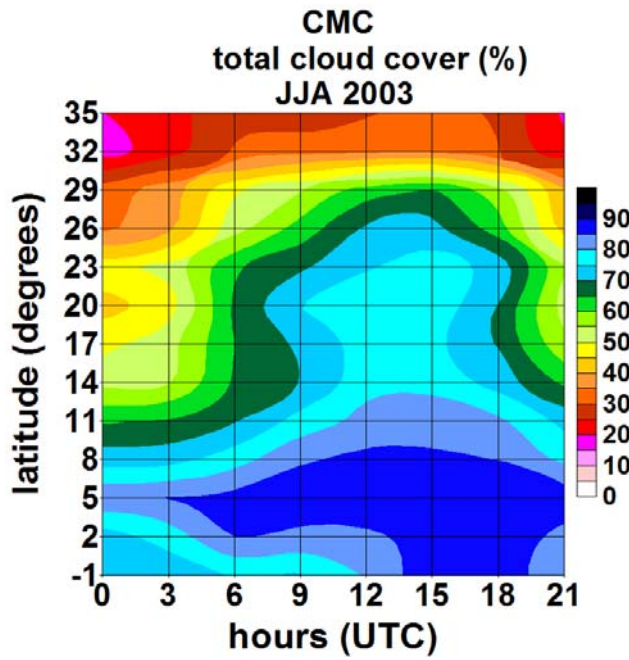


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 2003 mean diurnal cycle: total cloud cover.







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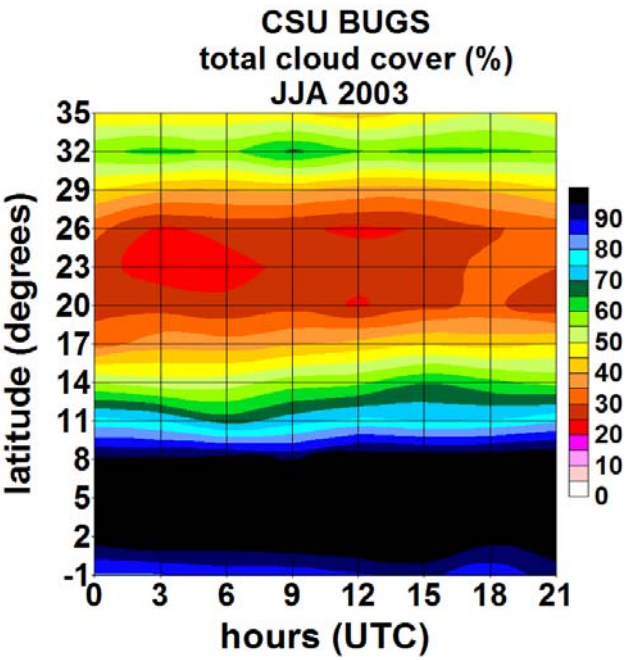

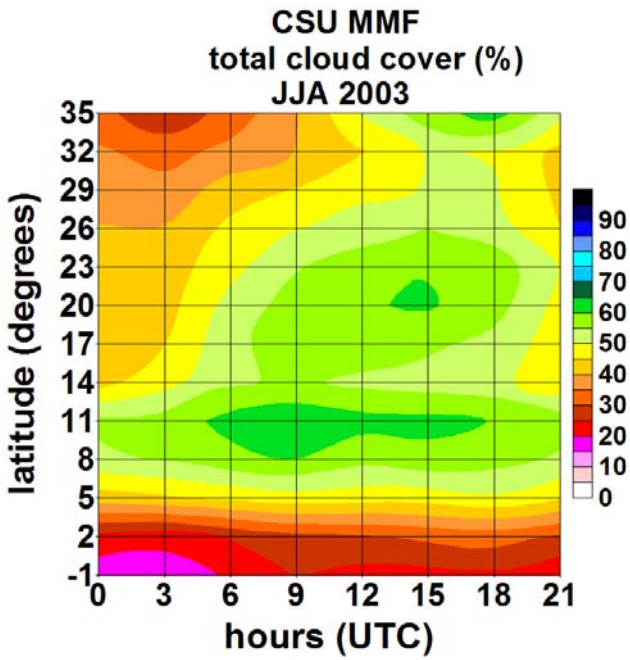

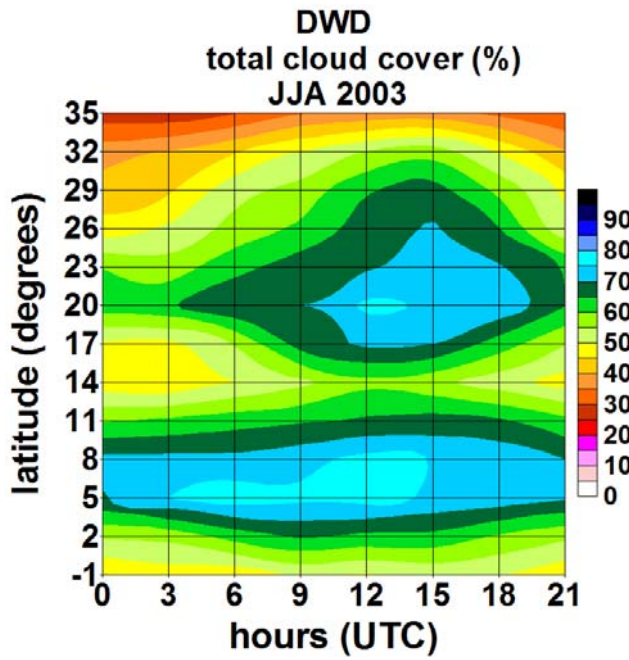

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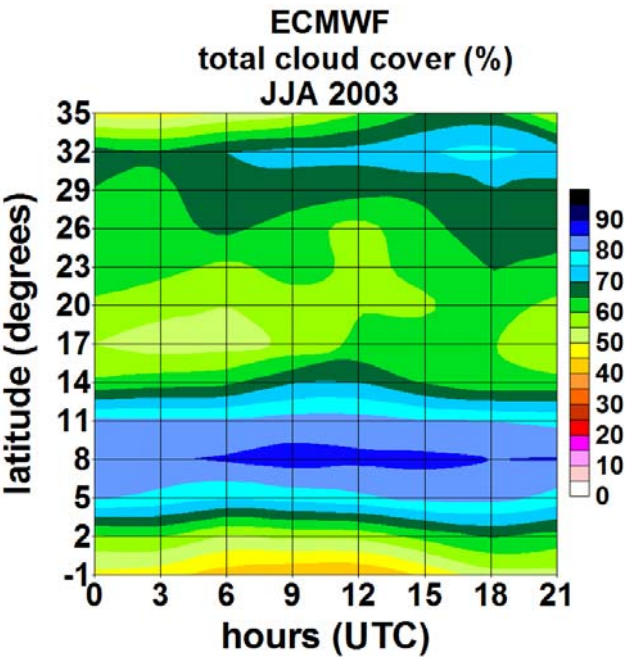

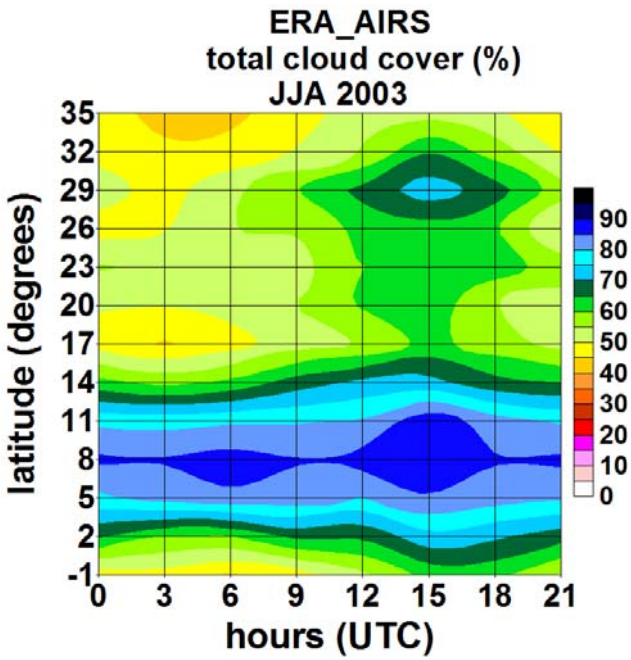

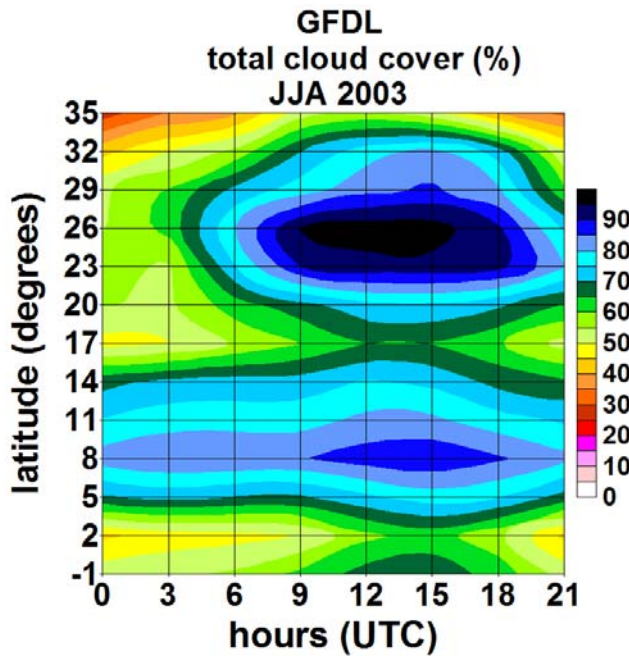

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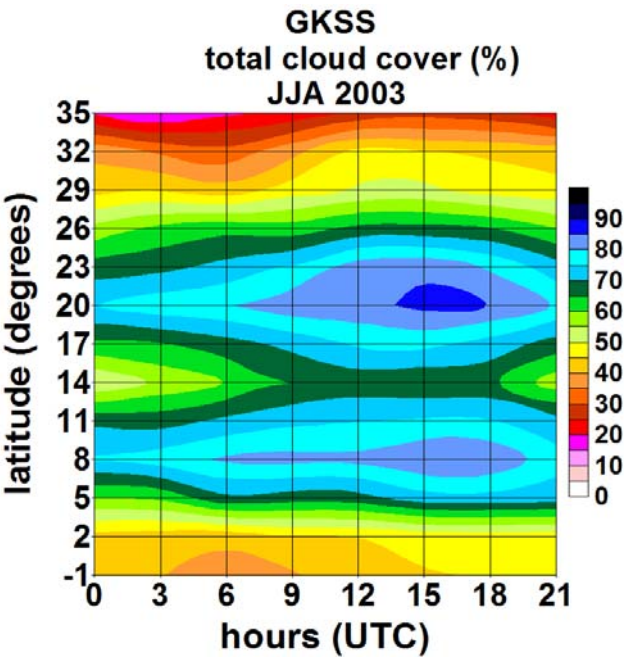

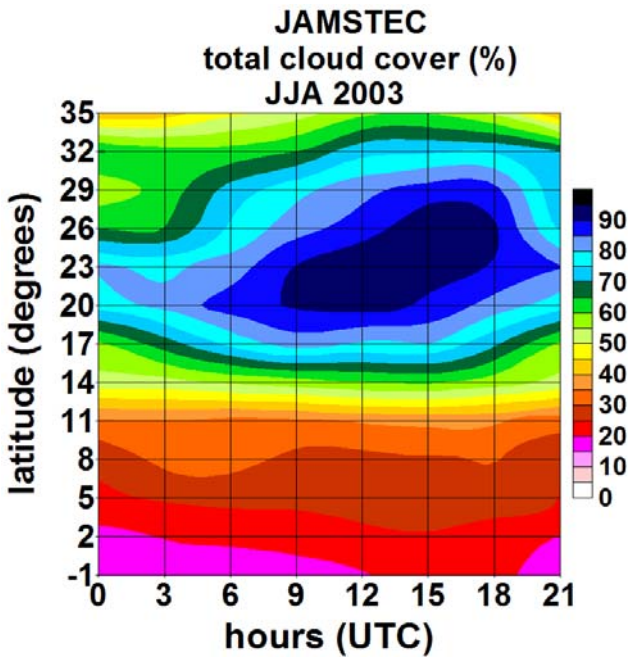

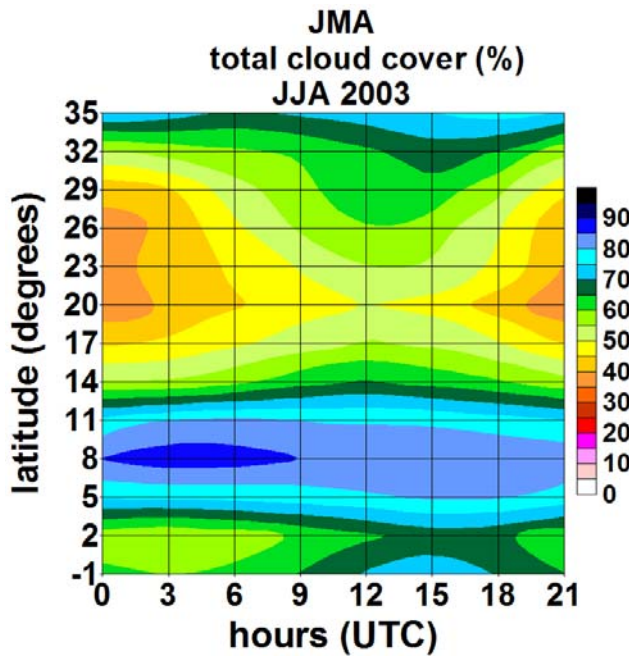

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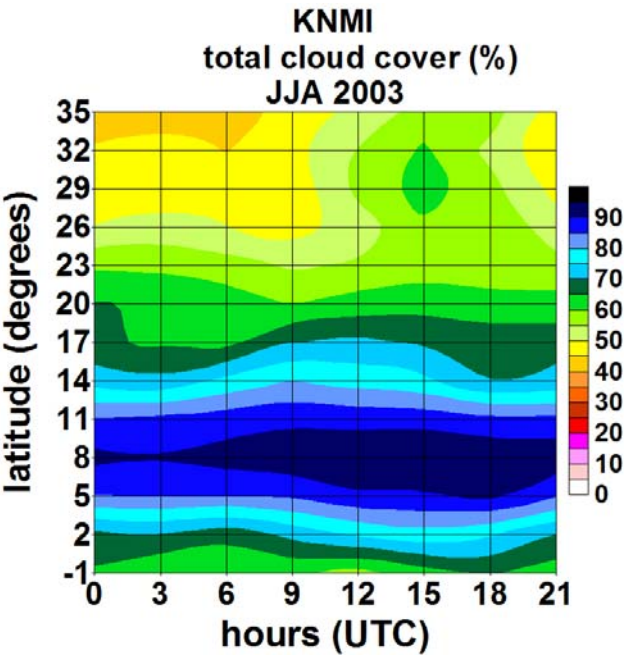

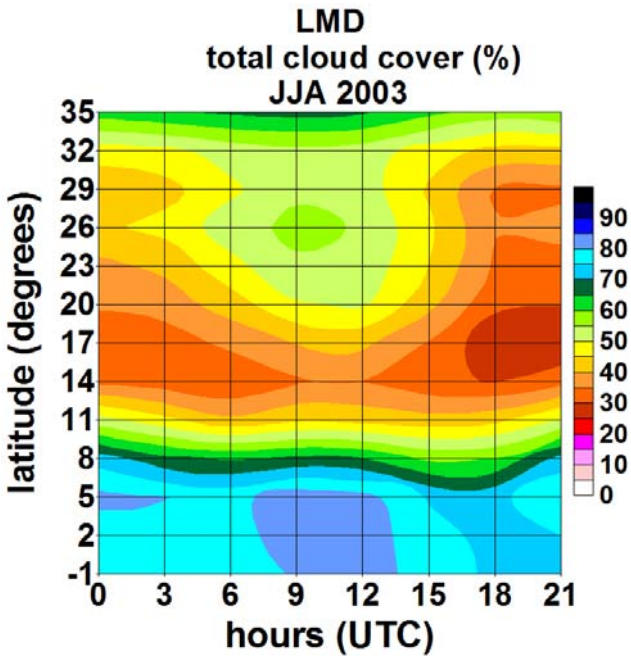

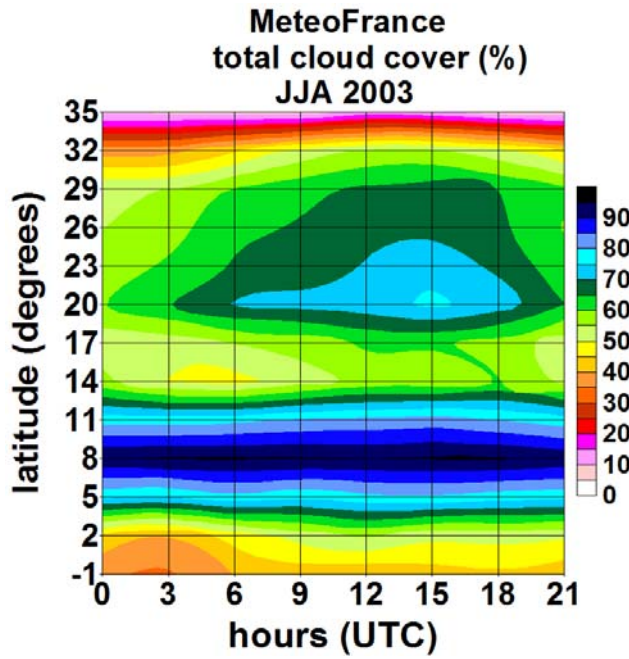

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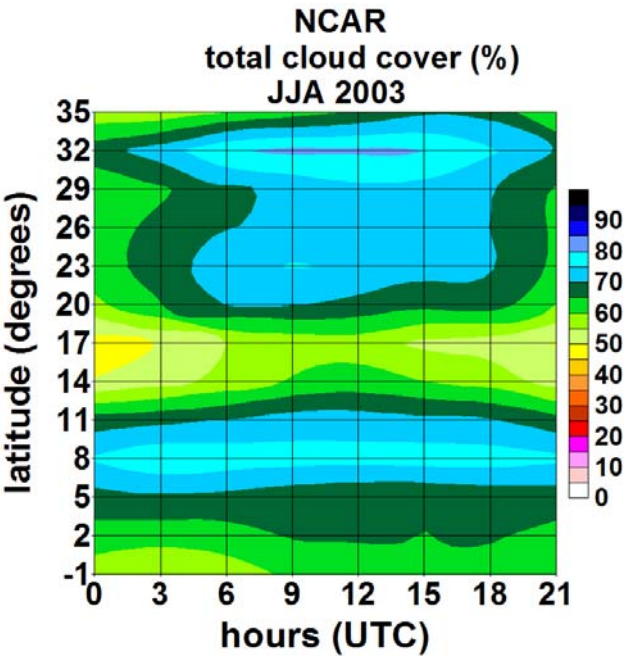

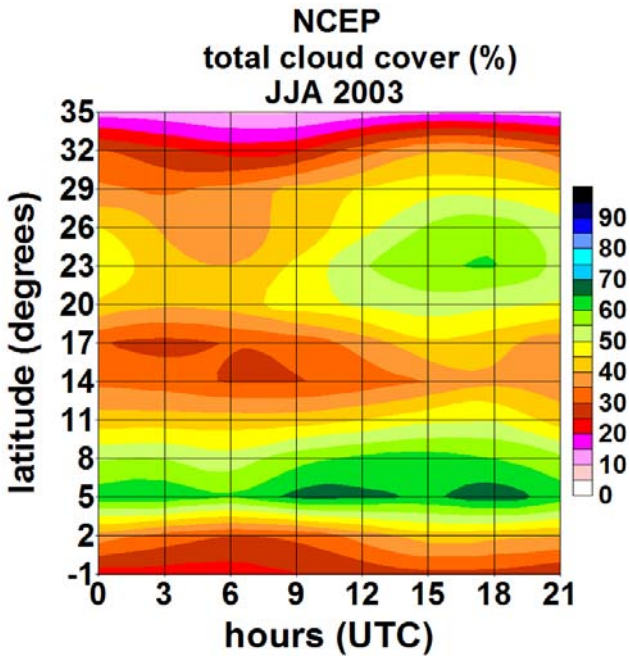

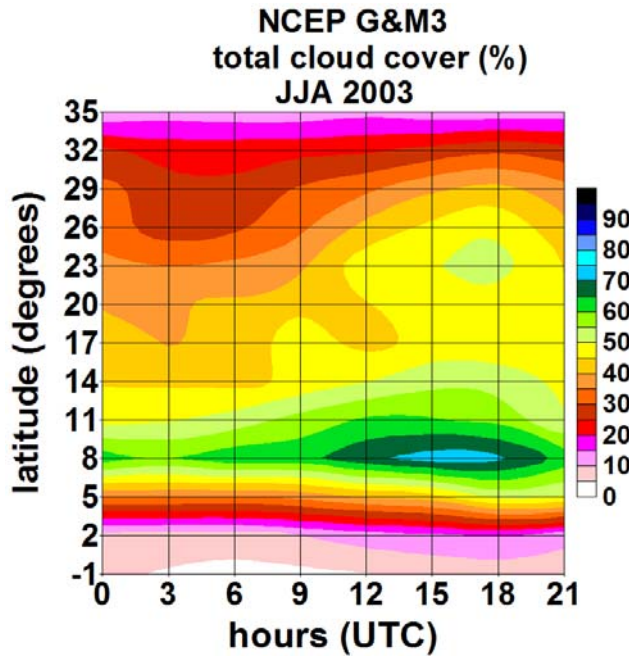

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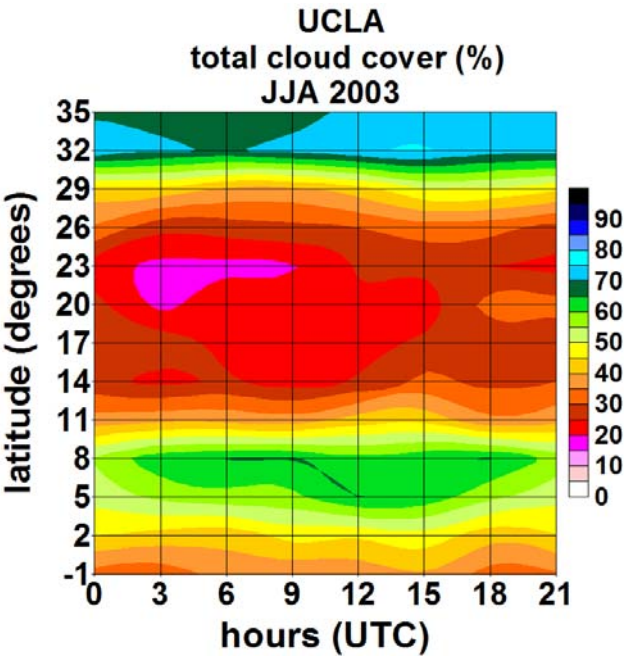
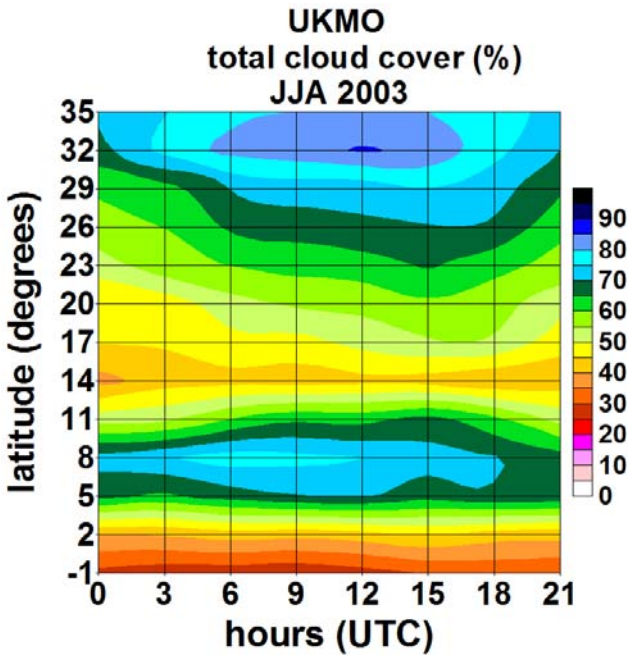
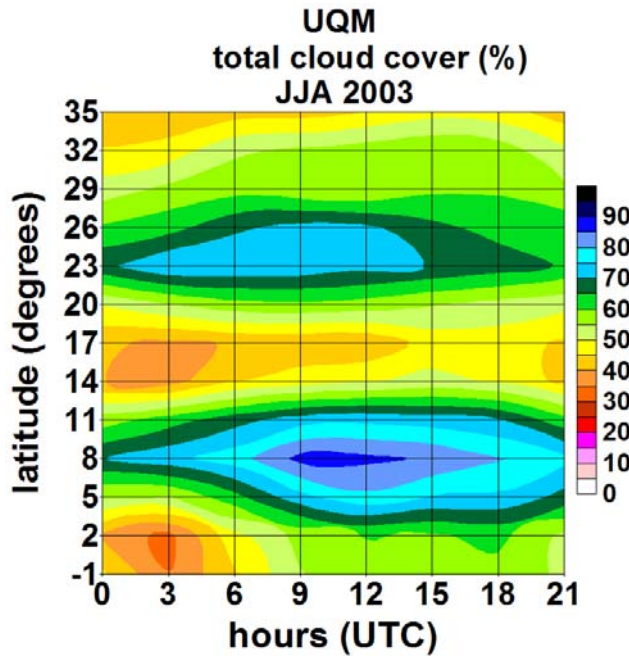
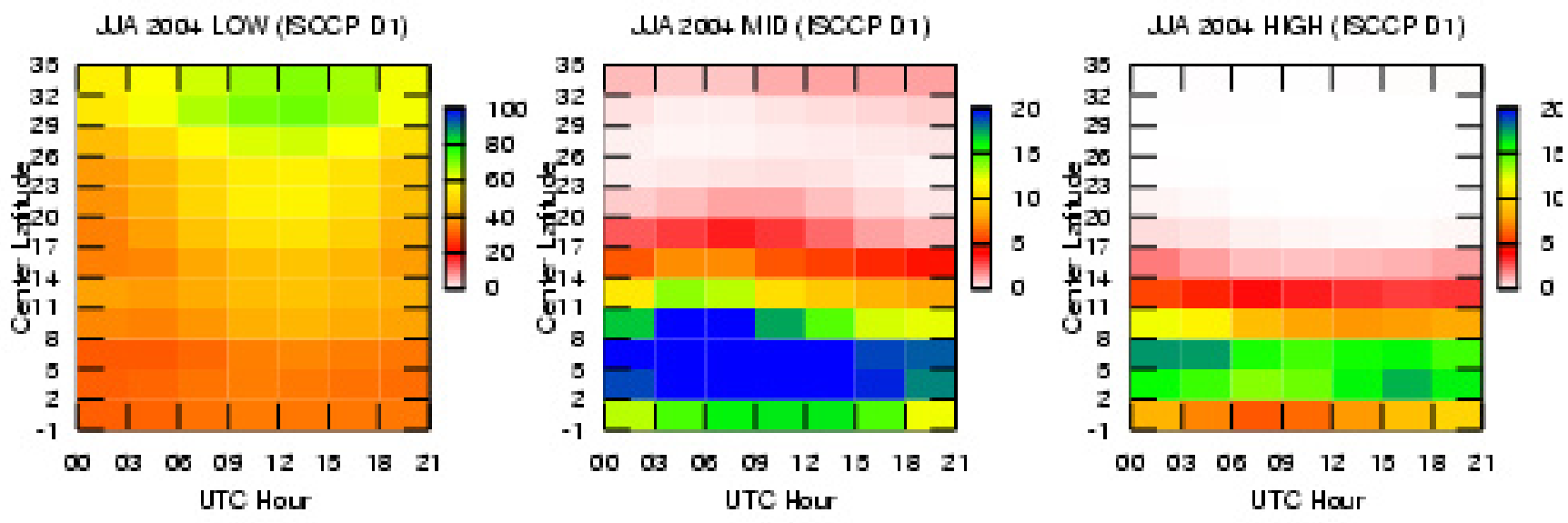






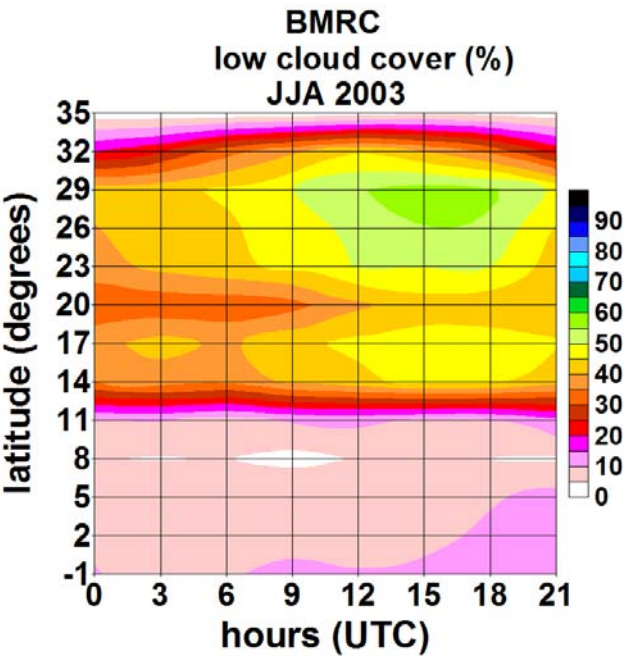
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

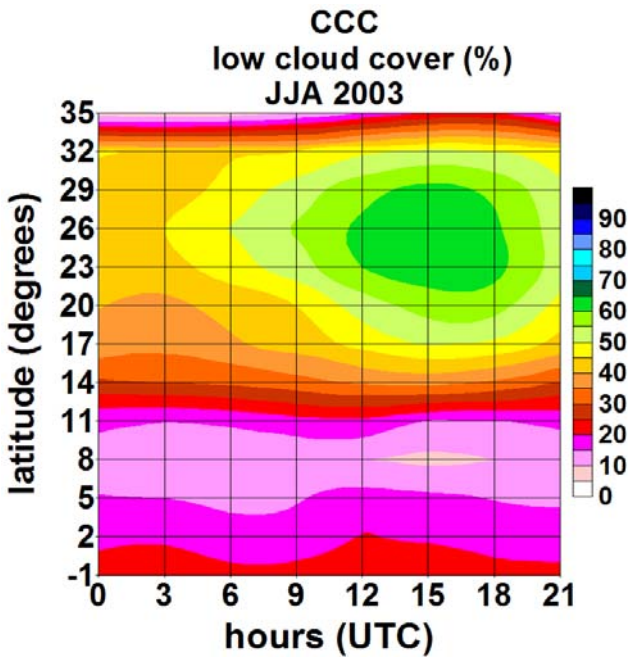
JJA 2003 mean diurnal cycle: low cloud cover.

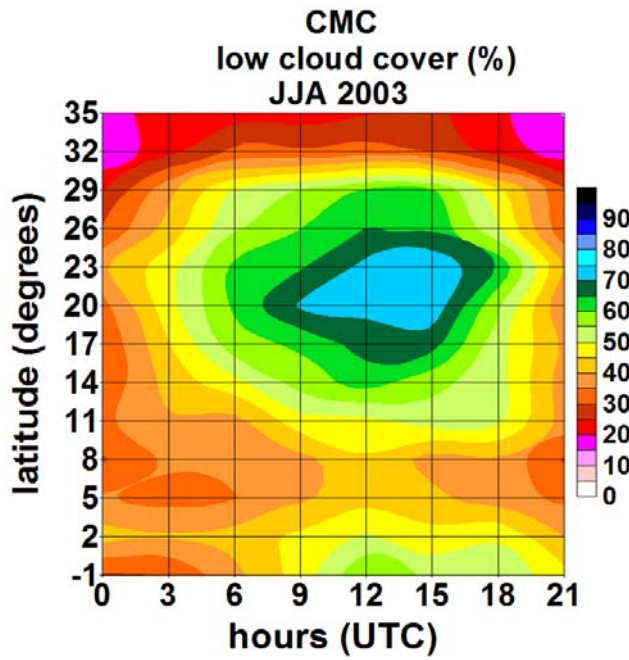


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

JJA 2003 mean diurnal cycle: low cloud cover.







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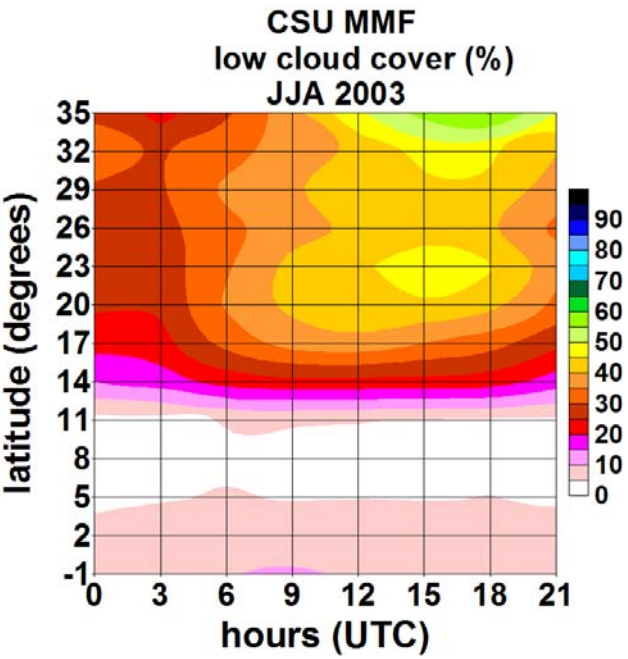

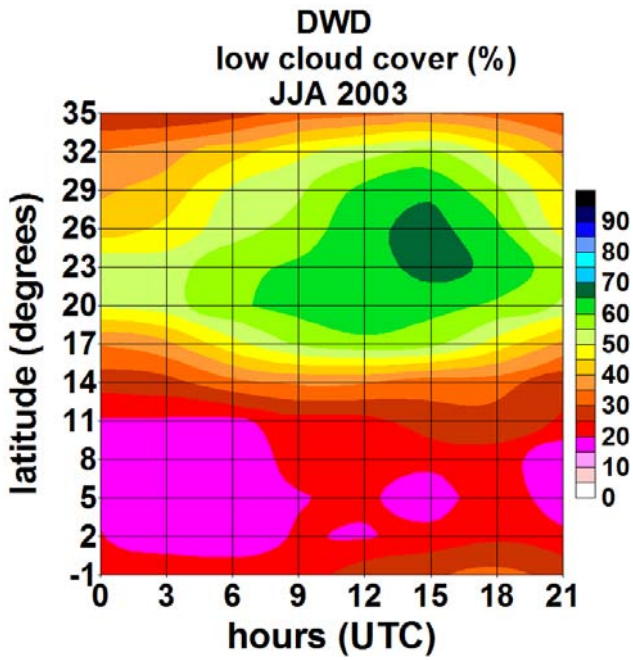

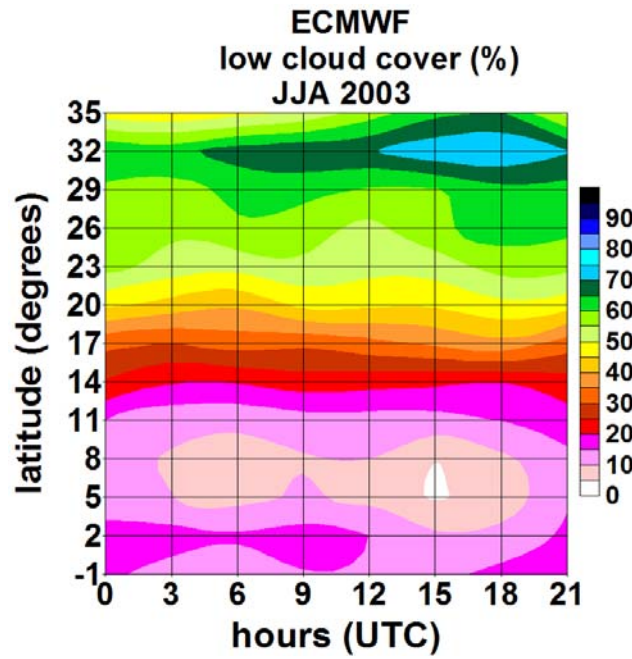

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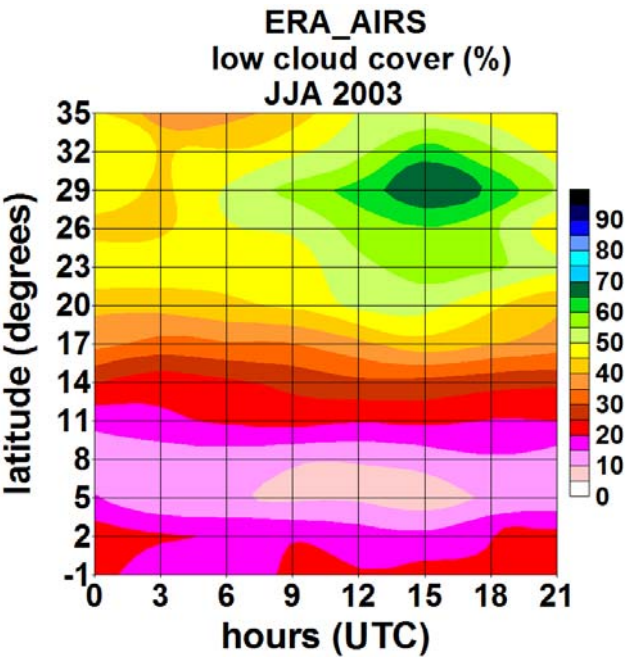

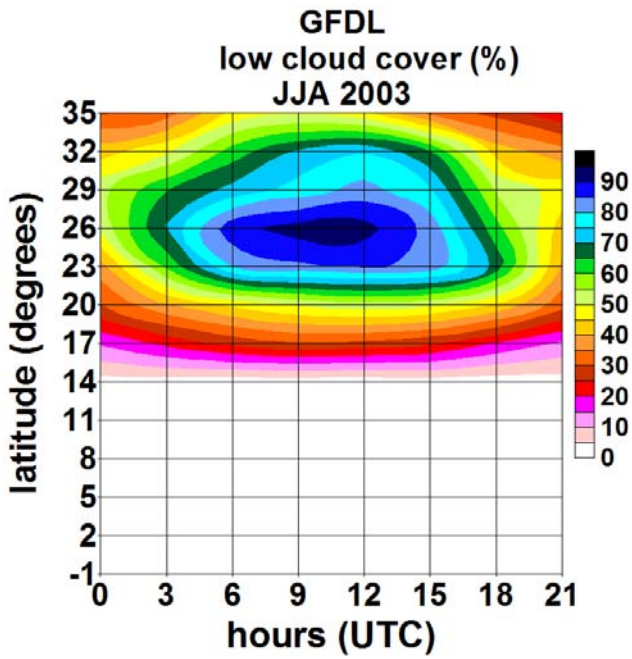

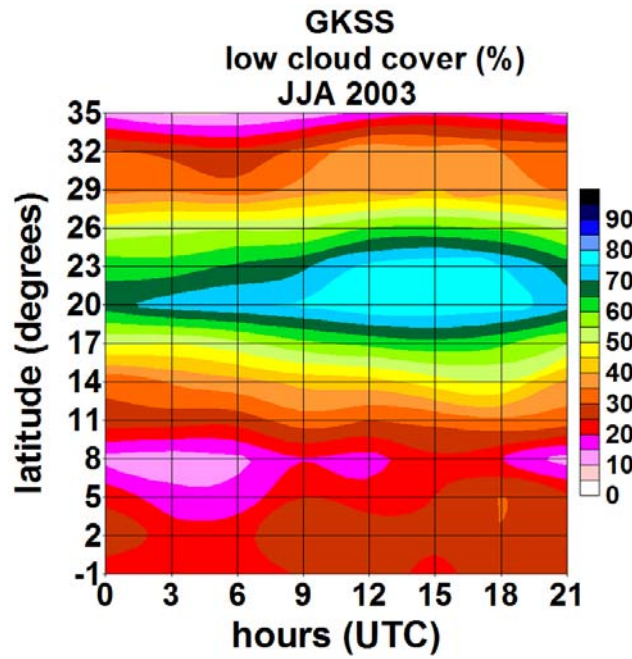

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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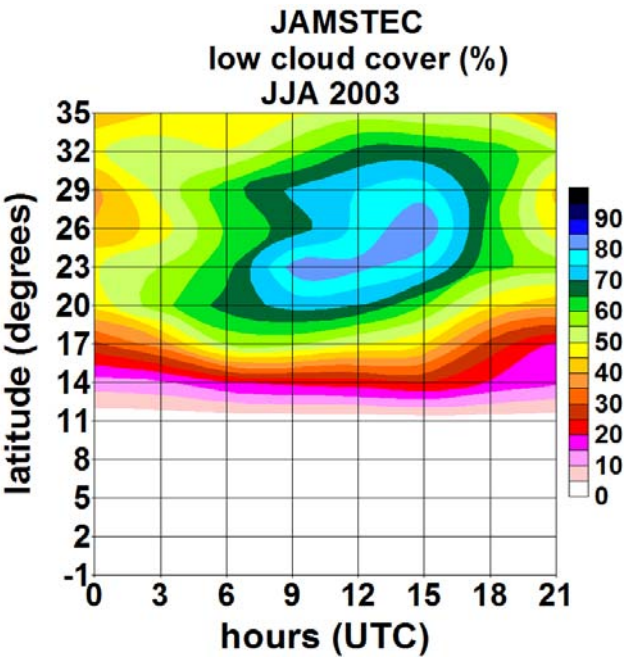

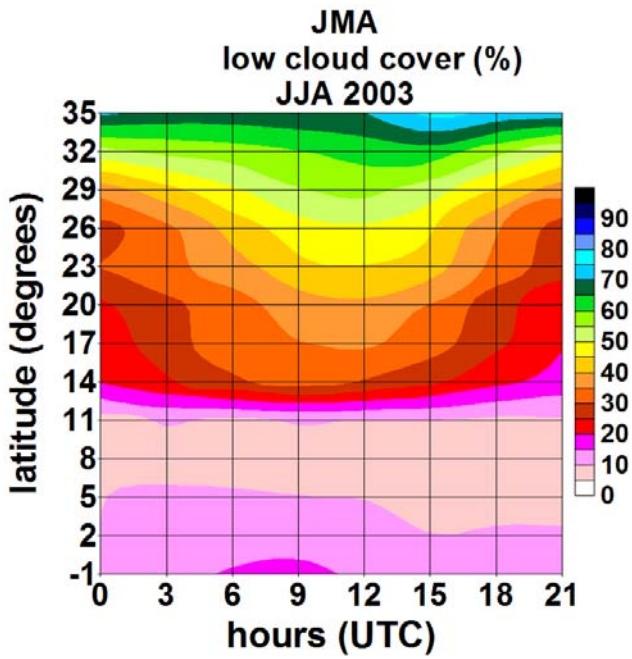

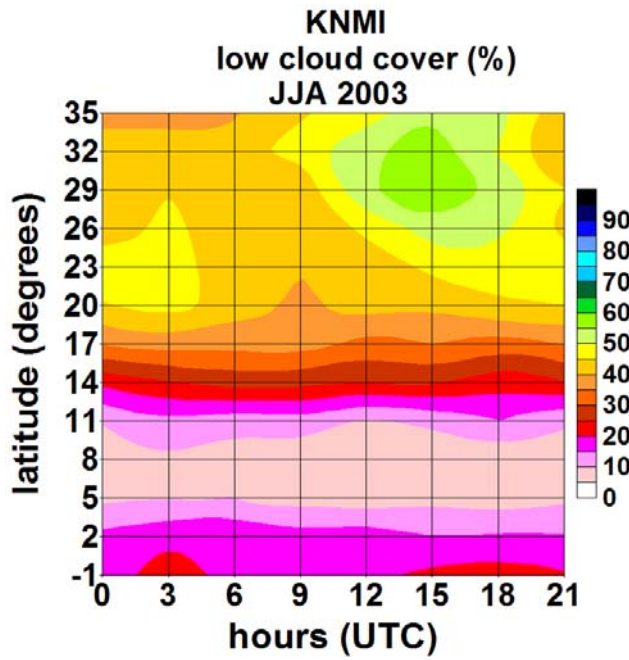

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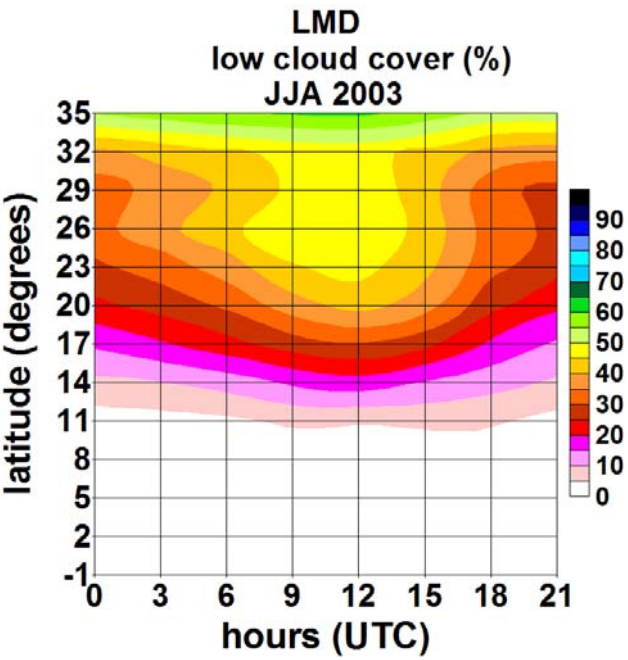

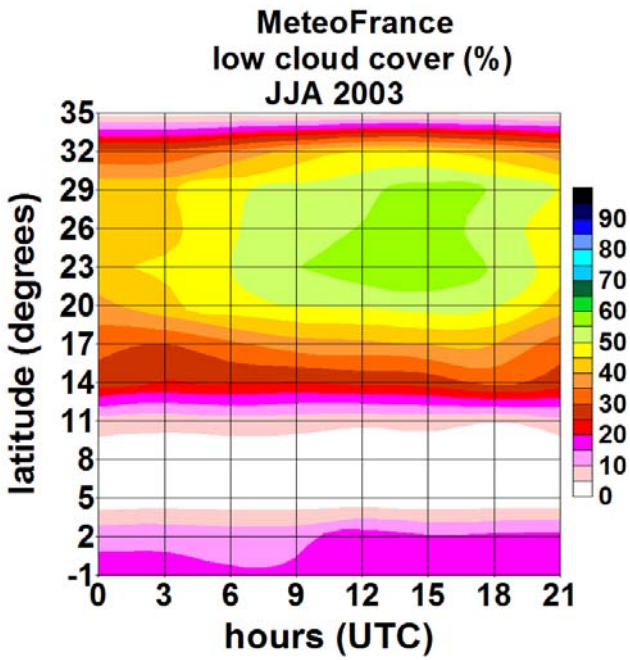

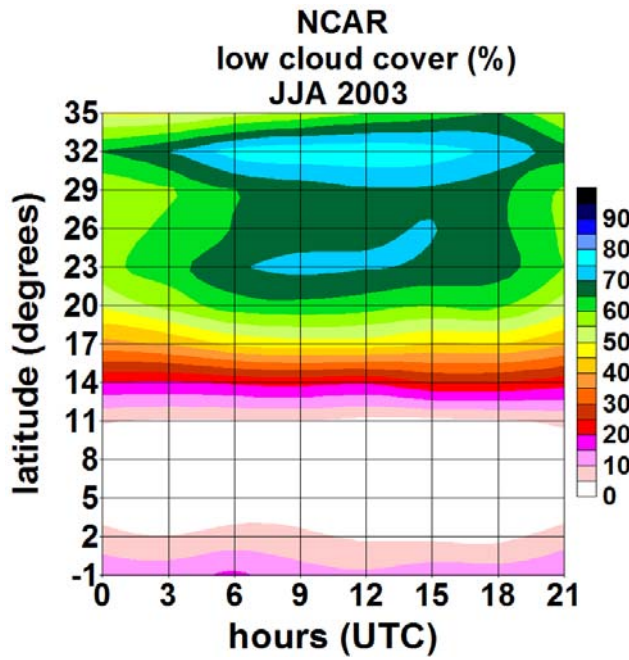

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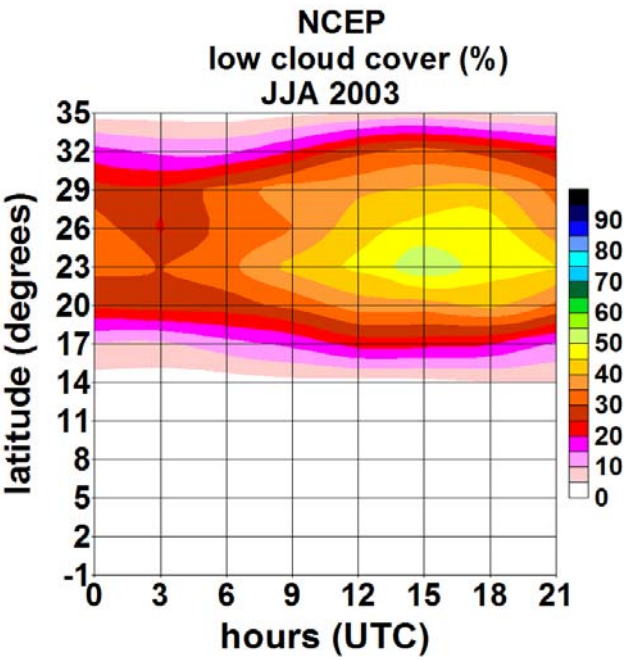

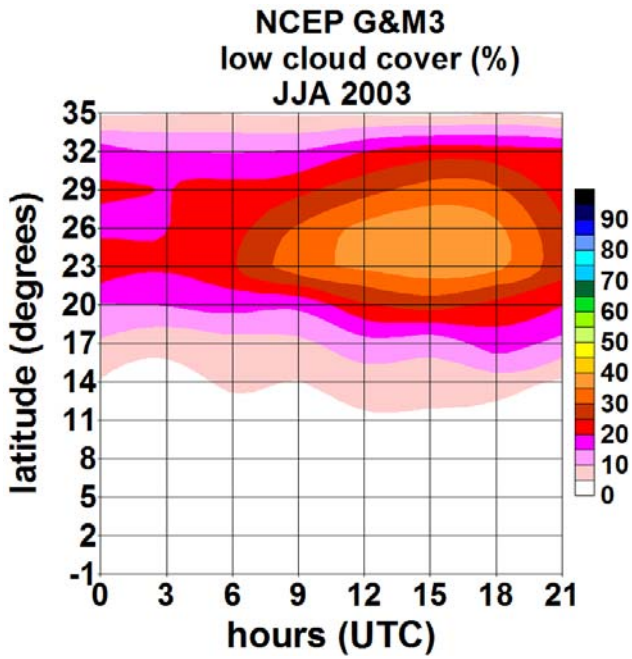

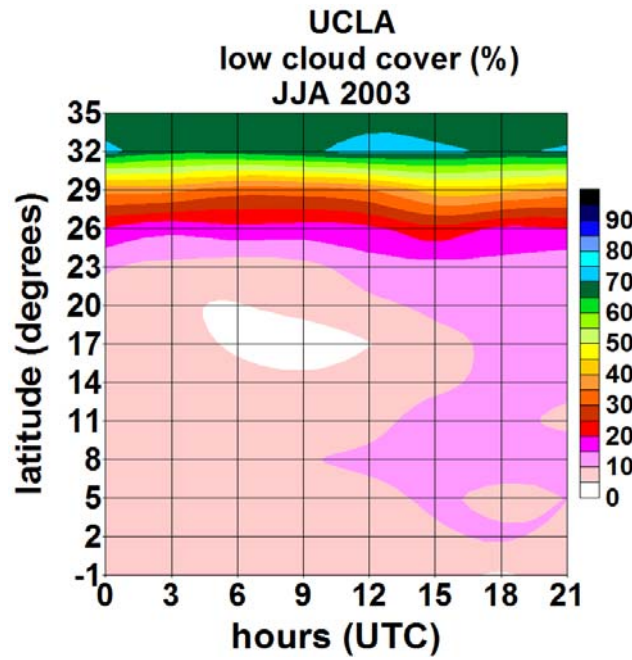

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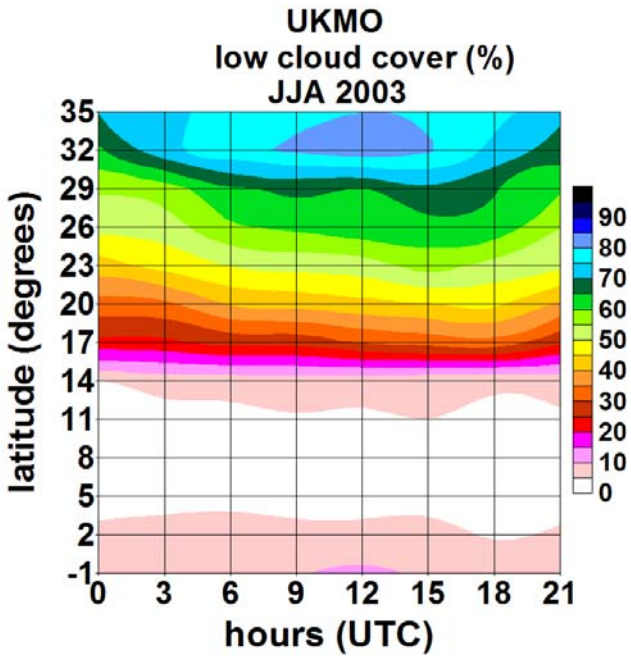
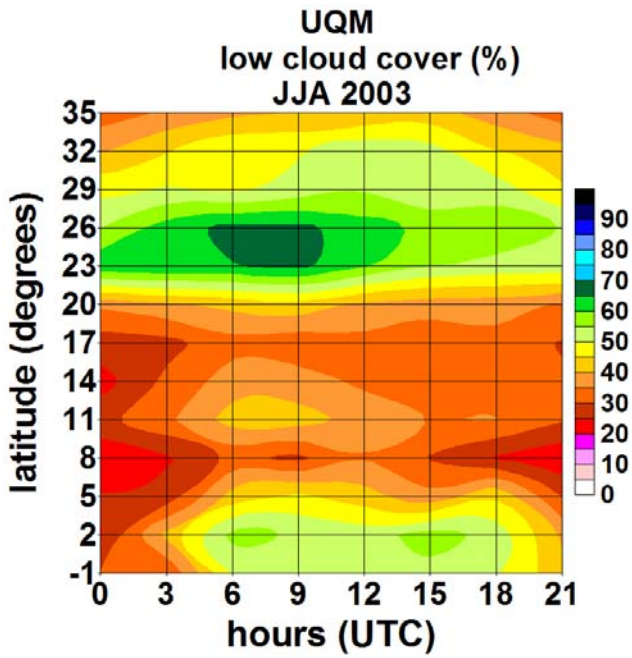
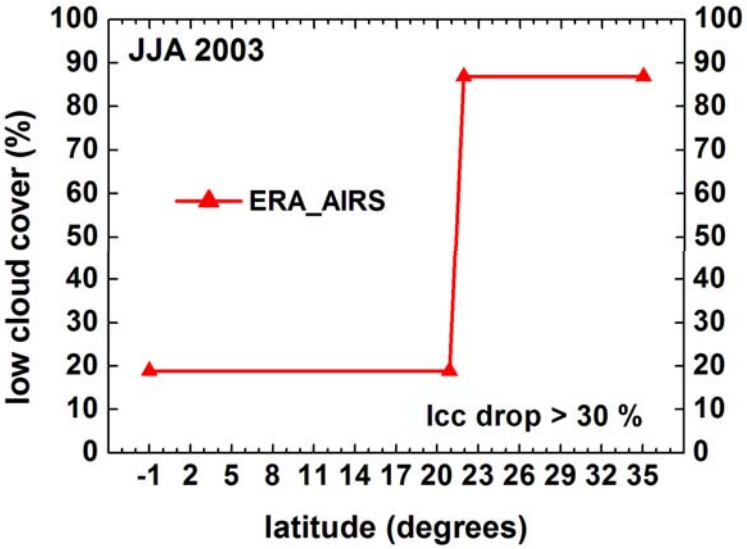
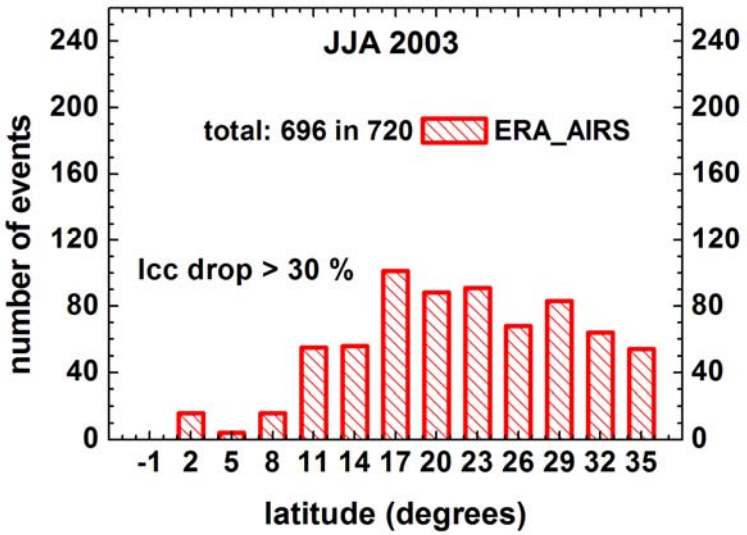




GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.





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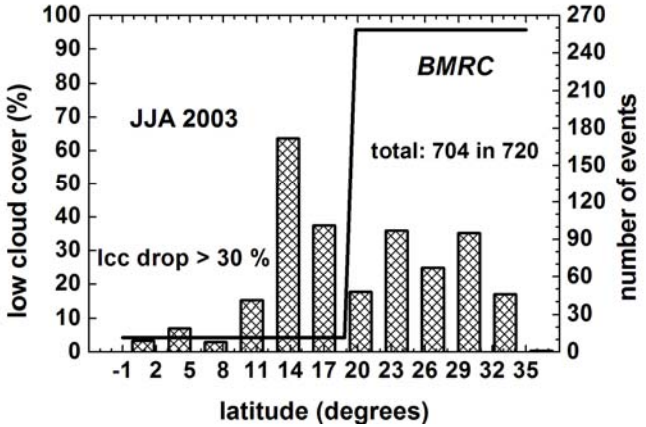

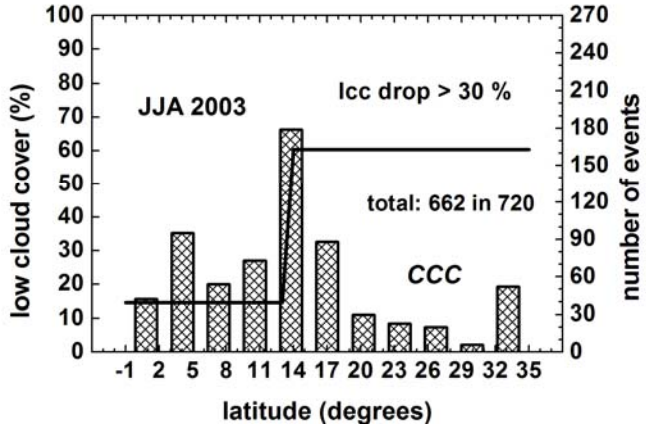

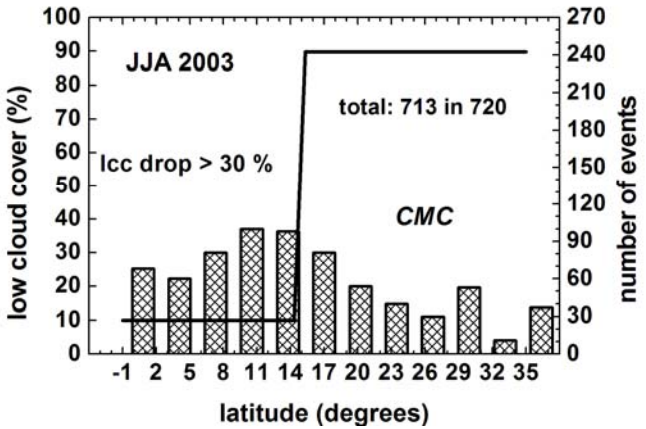

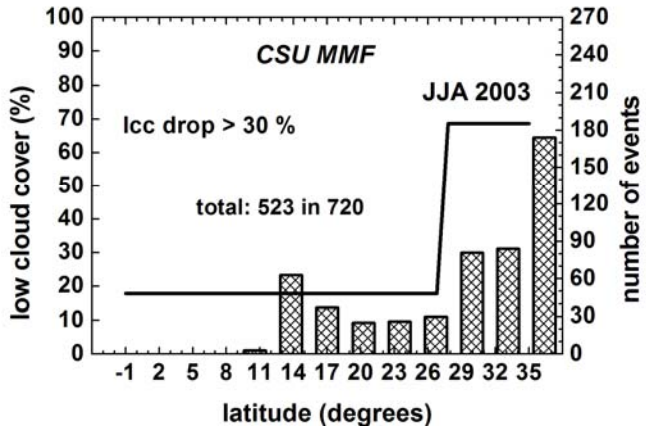

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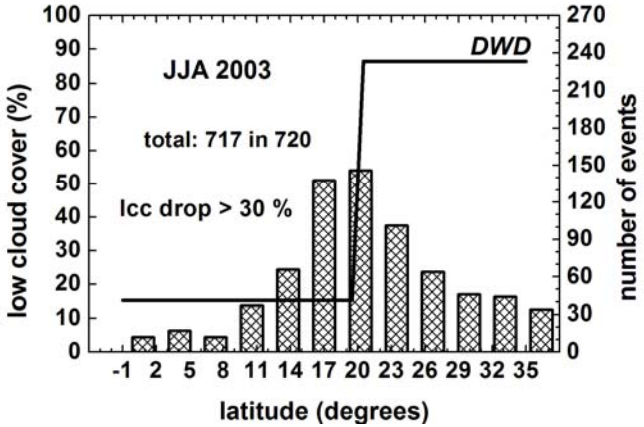

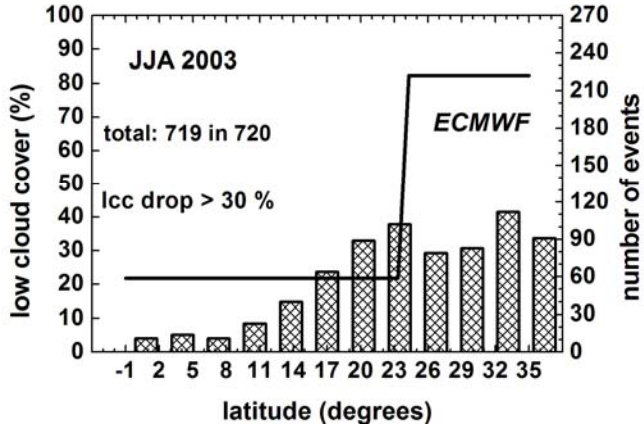

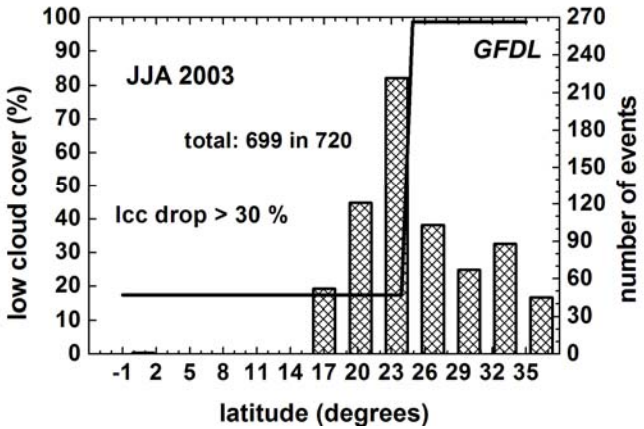

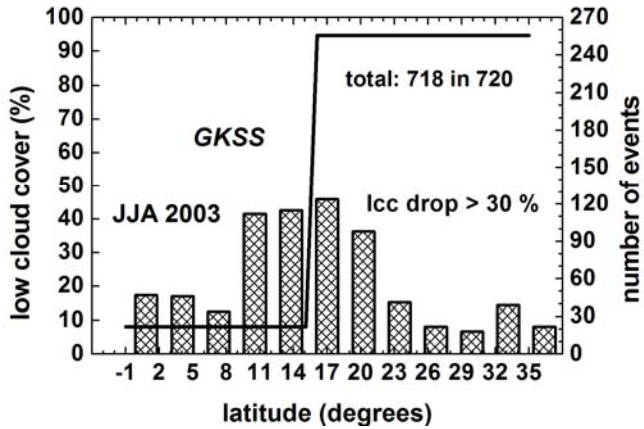

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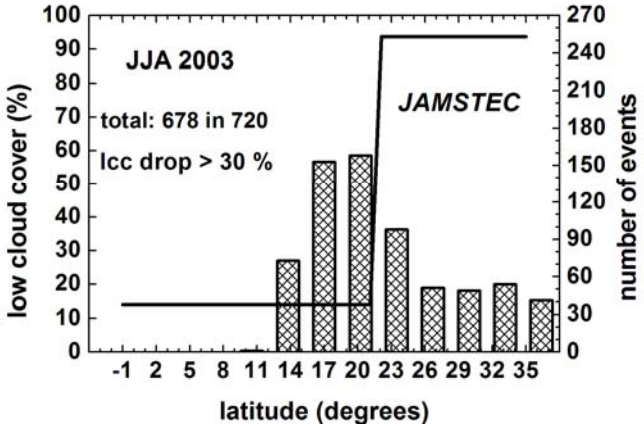
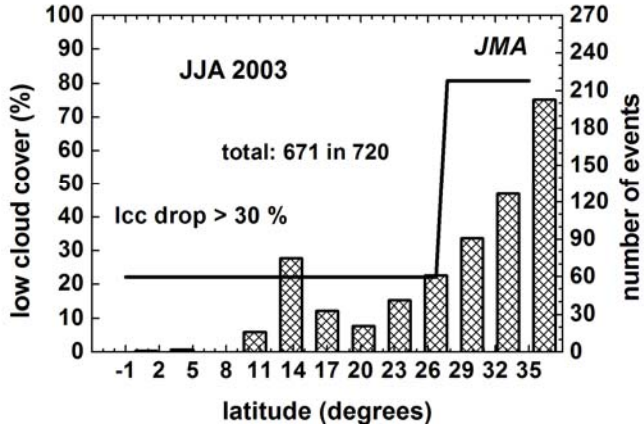
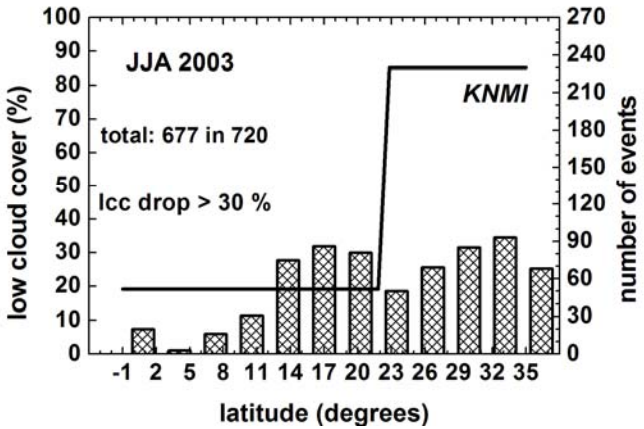
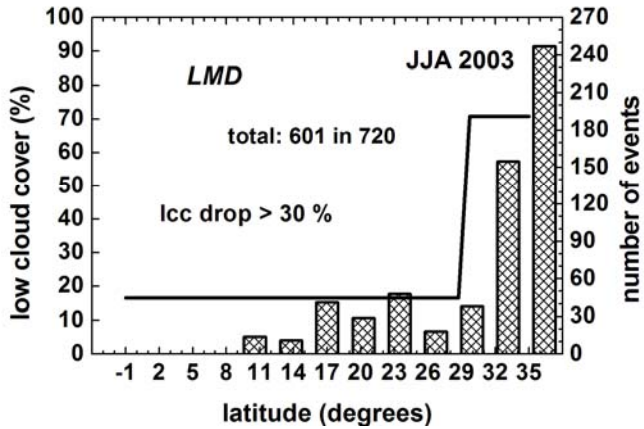


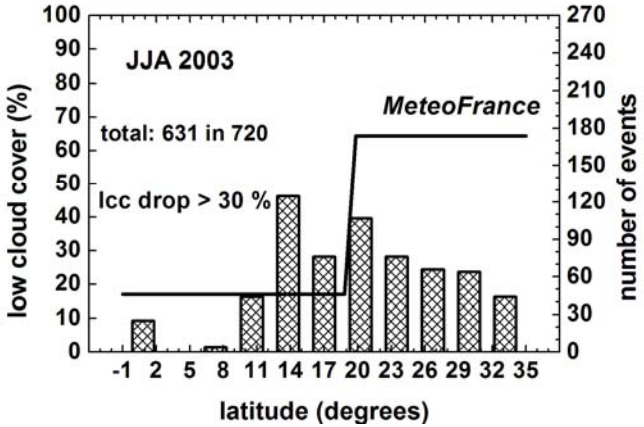


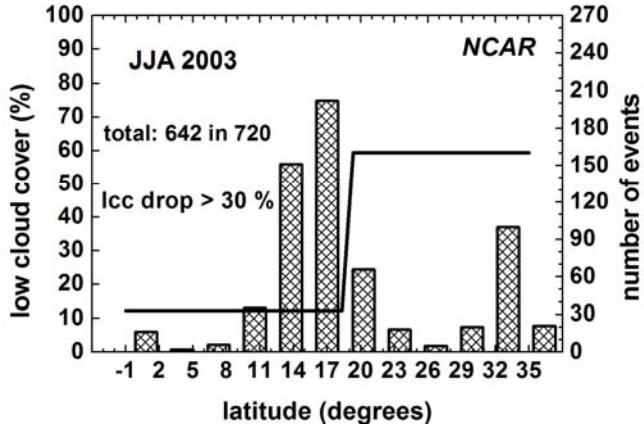


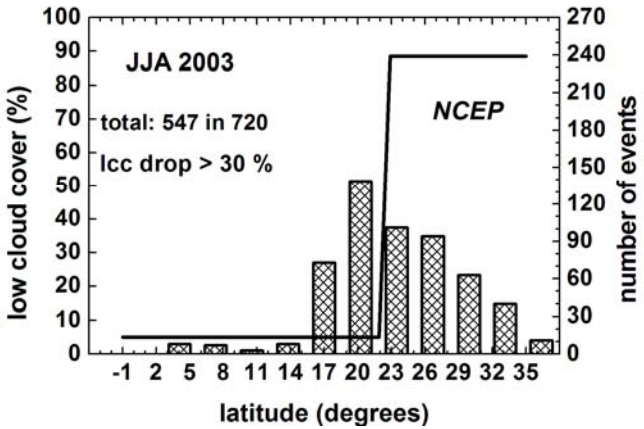


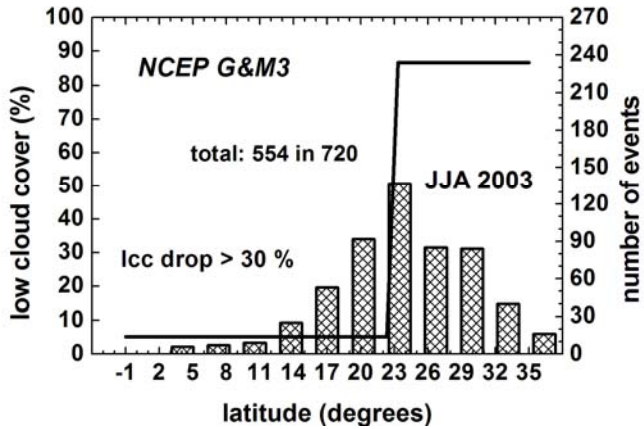
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.



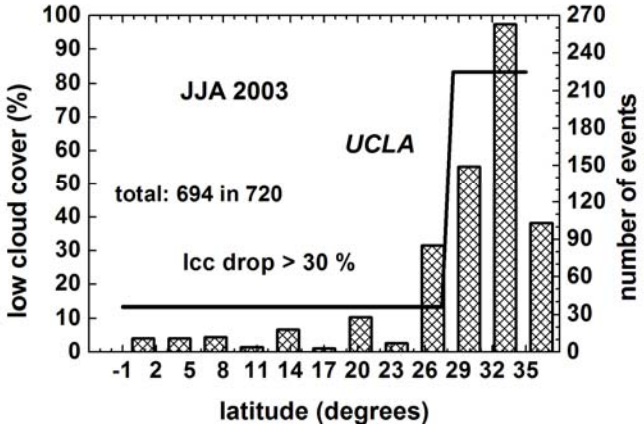


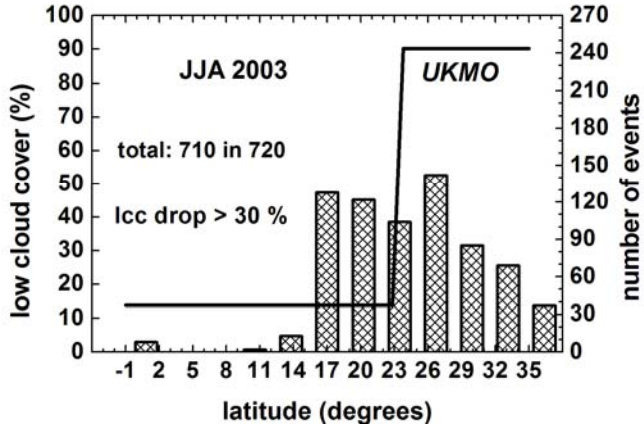


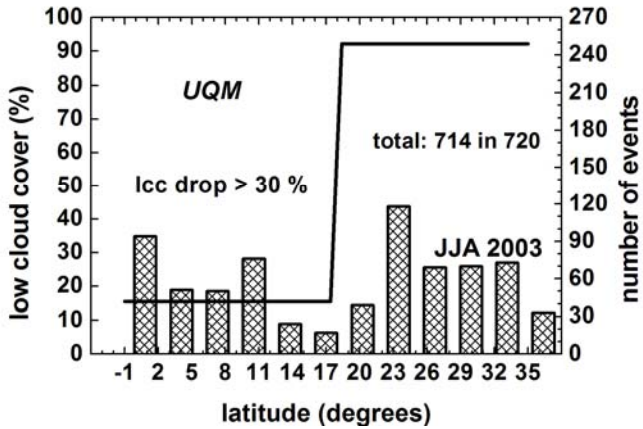


GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

Alternative mean low cloud cover:
assume existence of at least 1 sharp gradient of LCC.

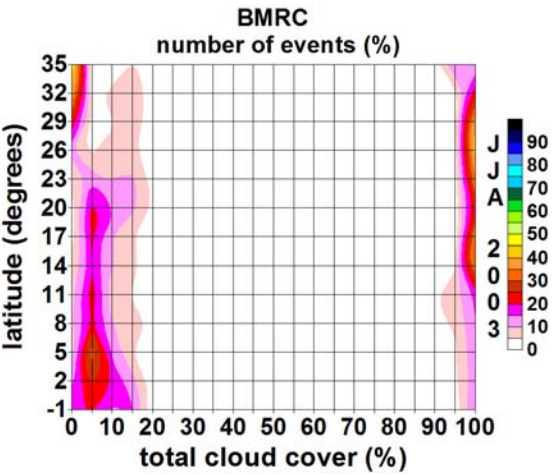


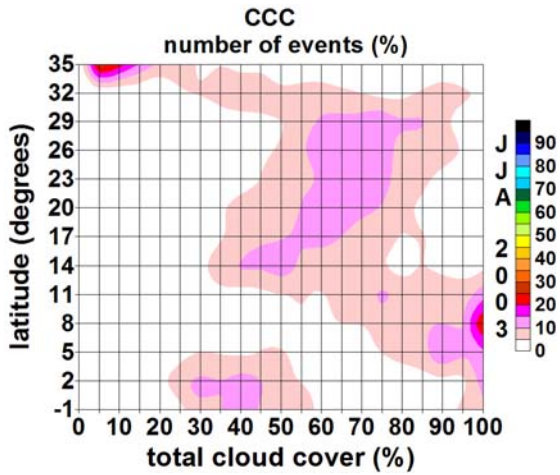


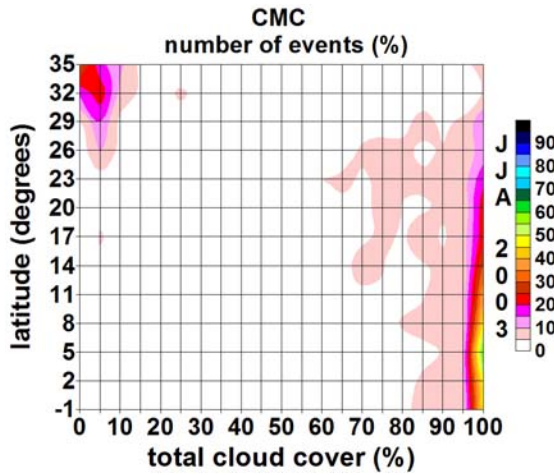


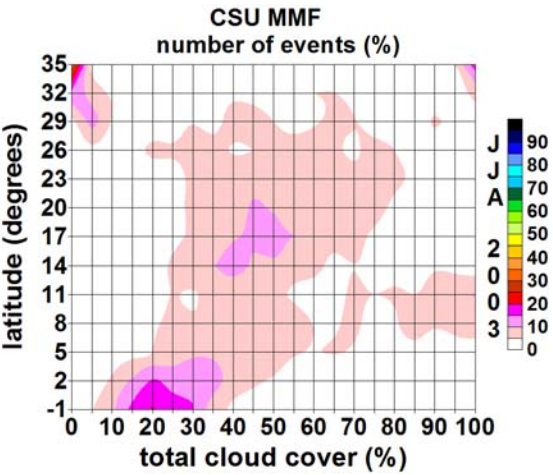
GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

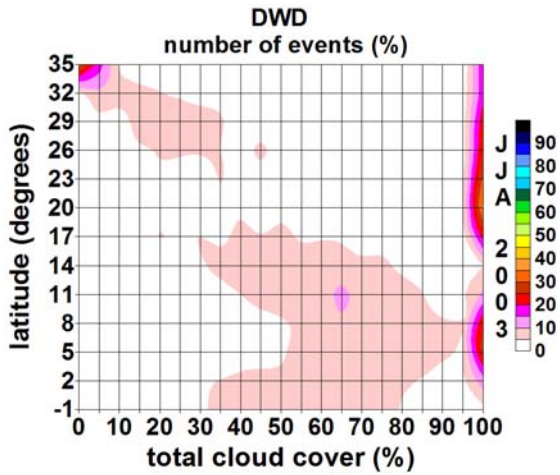
JJA 2003 histograms of total cloud cover.

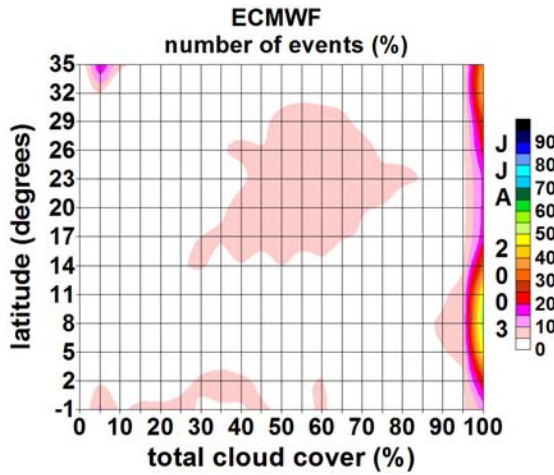












GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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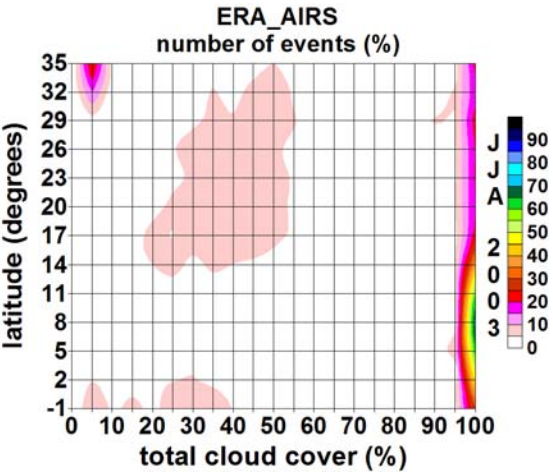

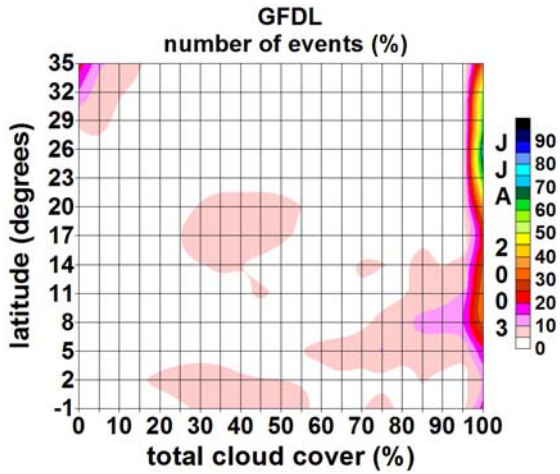

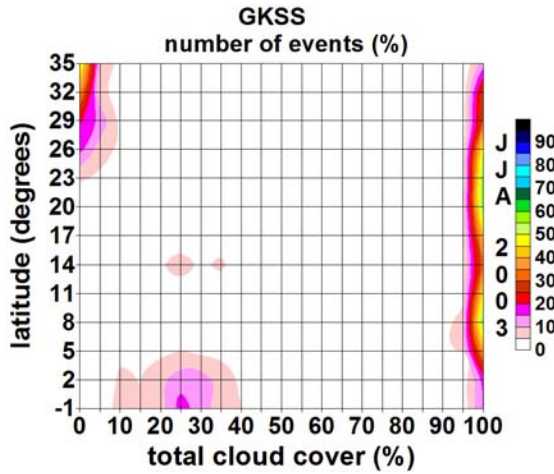

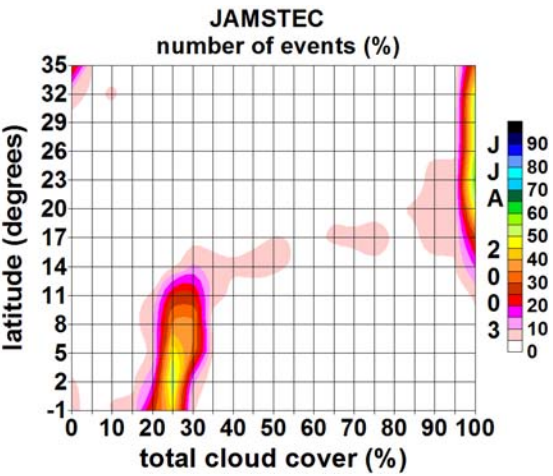

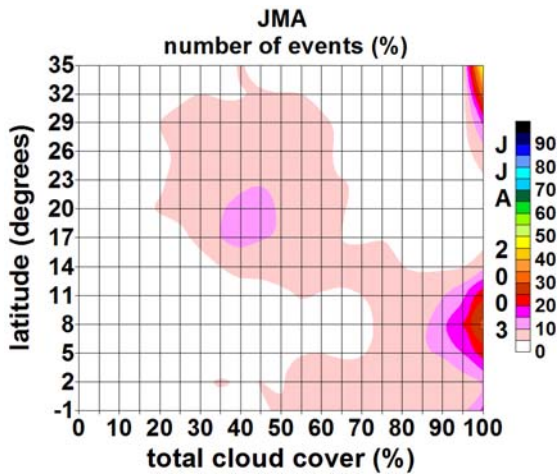

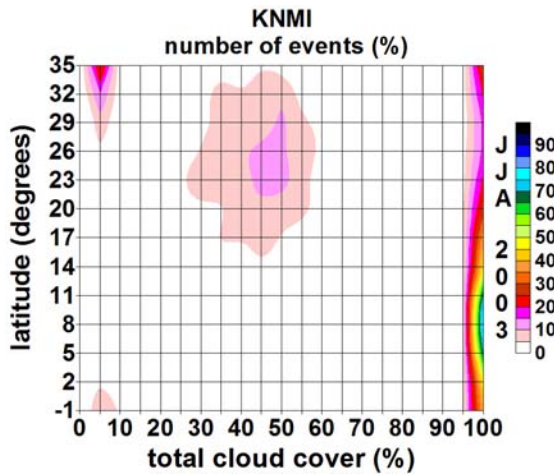

GCSS/WGNE Pacific Cross-section Intercomparison (GPCI)

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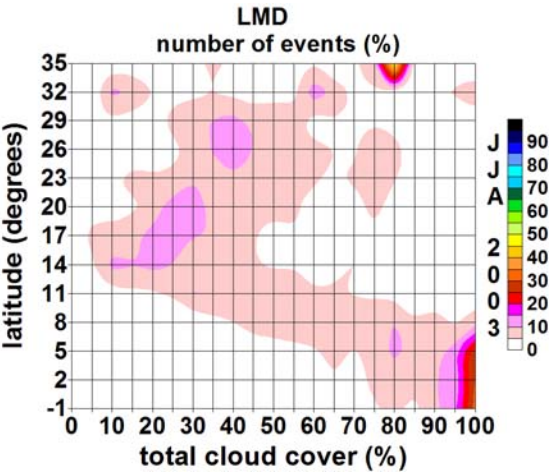

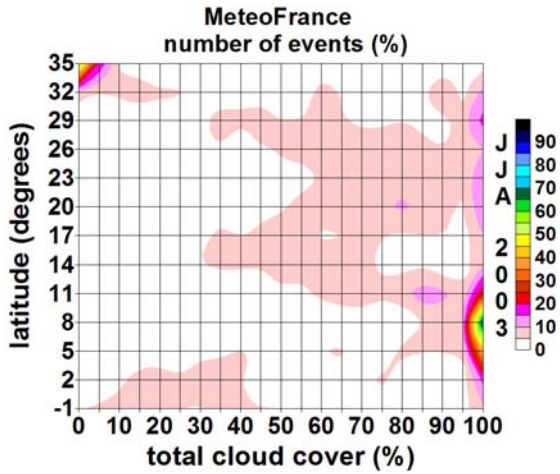

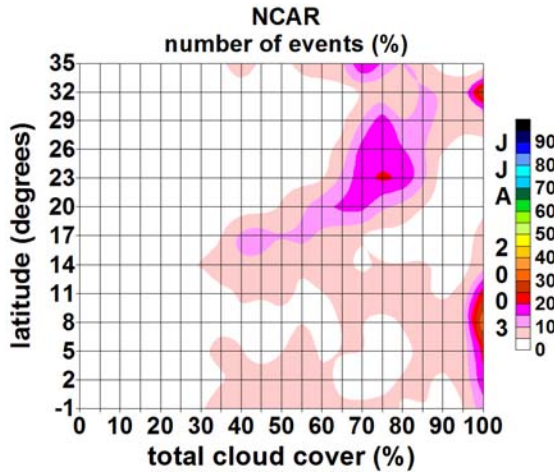

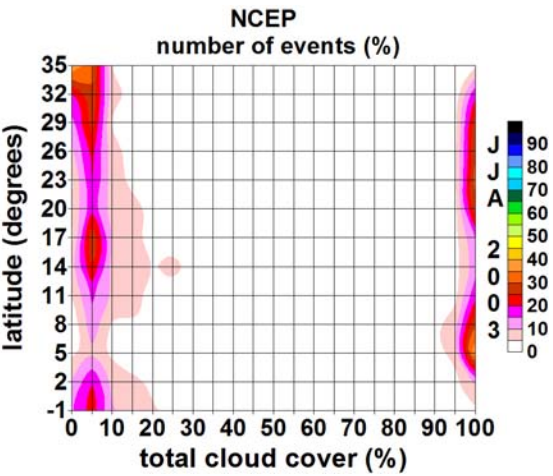

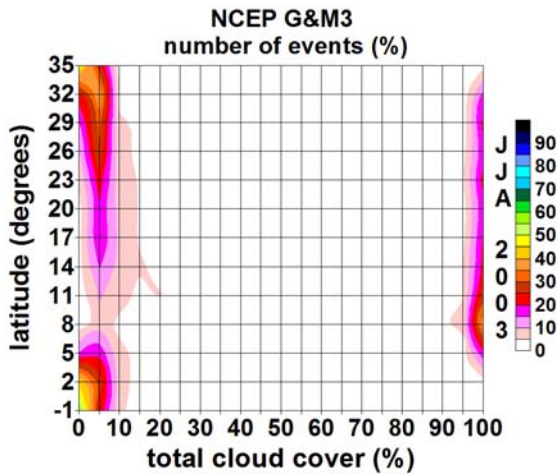

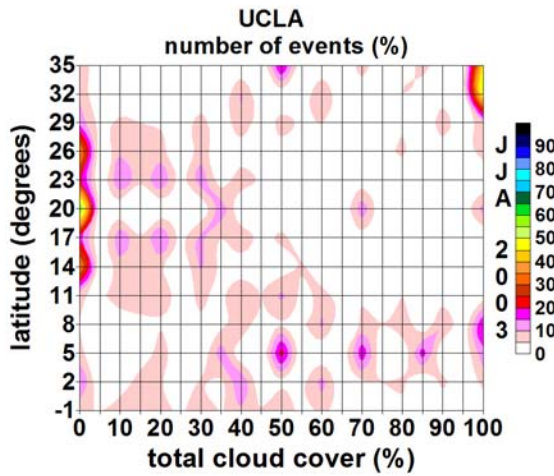

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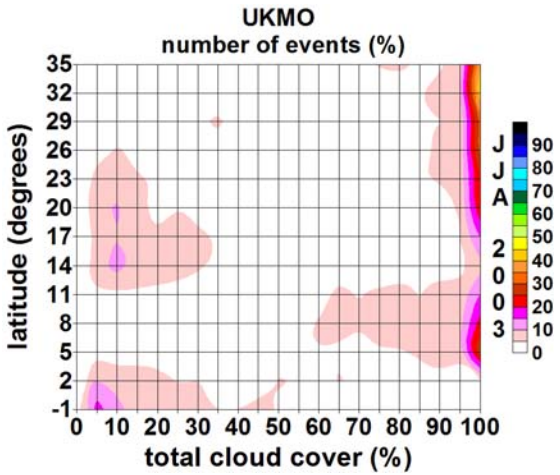

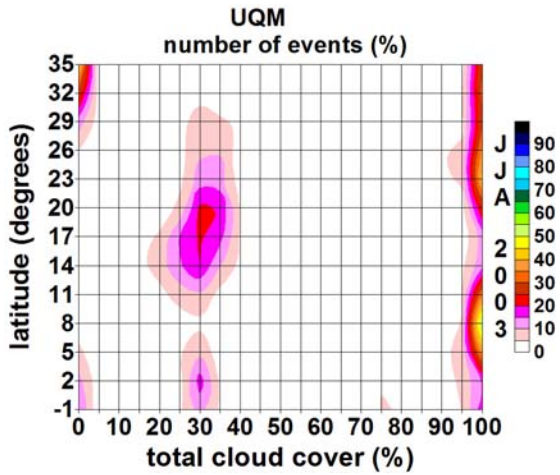

The End