

Does the quality of the high-resolution topography prescribed in LMDz alter the simulated climate ?

A sensitivity study with LMDZOR

Pierre Sepulchre – Journées LMDz – 11 June 2018

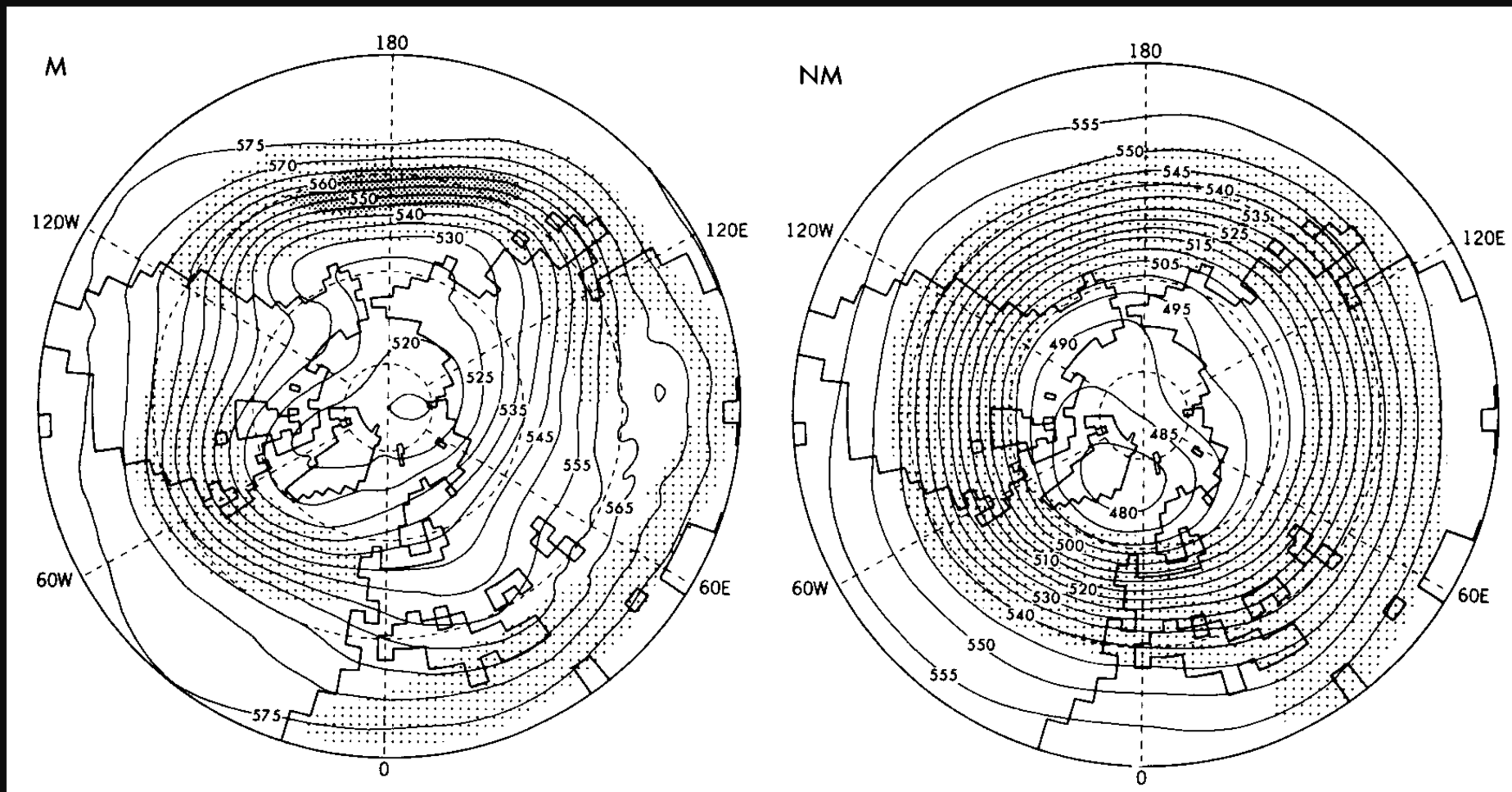


The Effects of Orography on Midlatitude Northern Hemisphere Dry Climates

A. J. BROCCOLI AND S. MANABE

Geophysical Fluid Dynamics Laboratory/NOAA, Princeton University, Princeton, New Jersey

(Manuscript received 18 July 1991, in final form 13 February 1992)

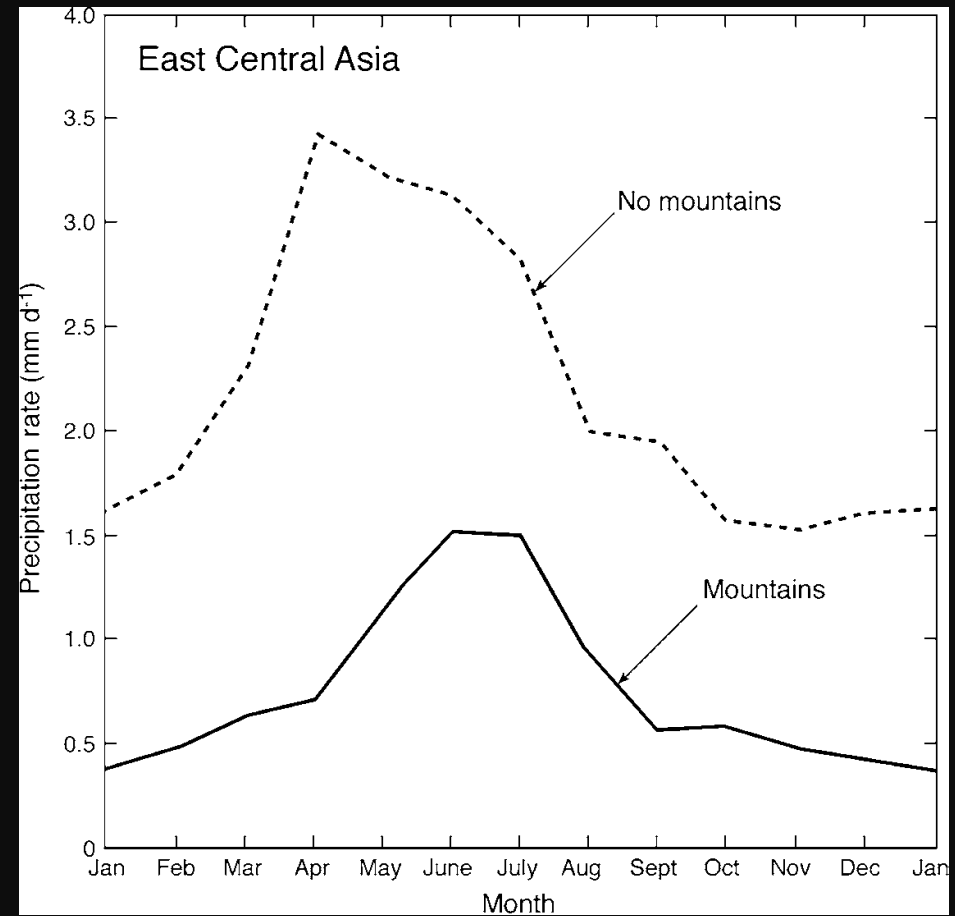
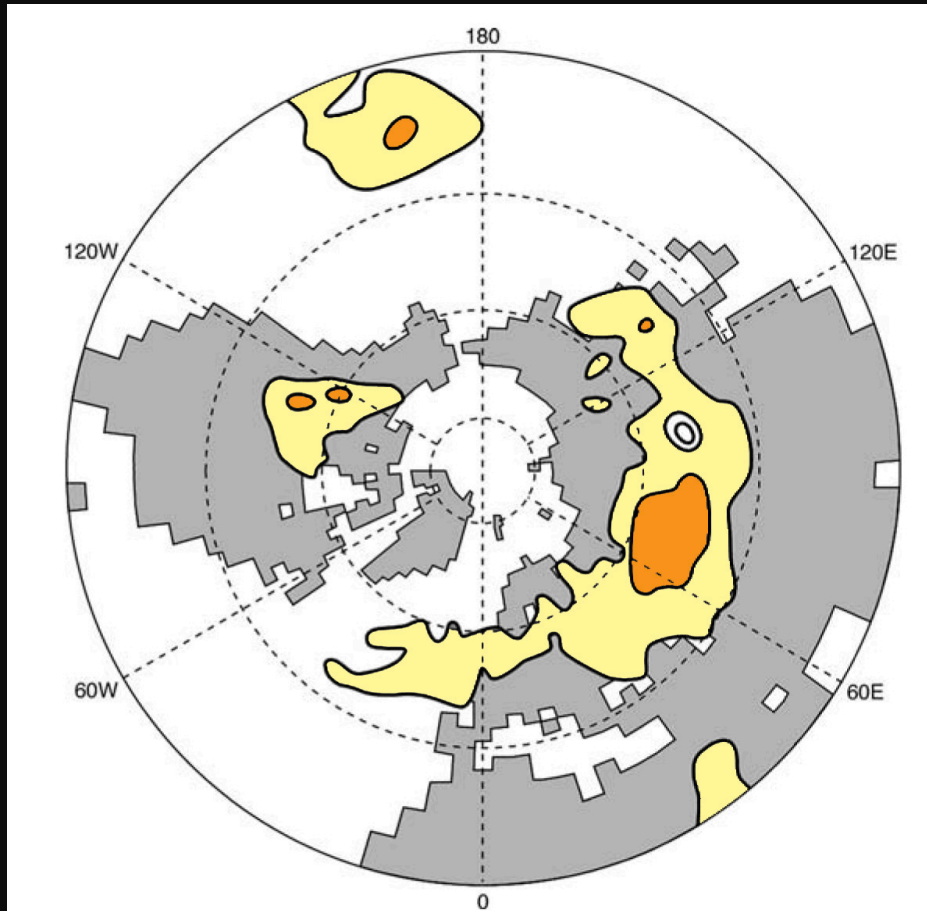


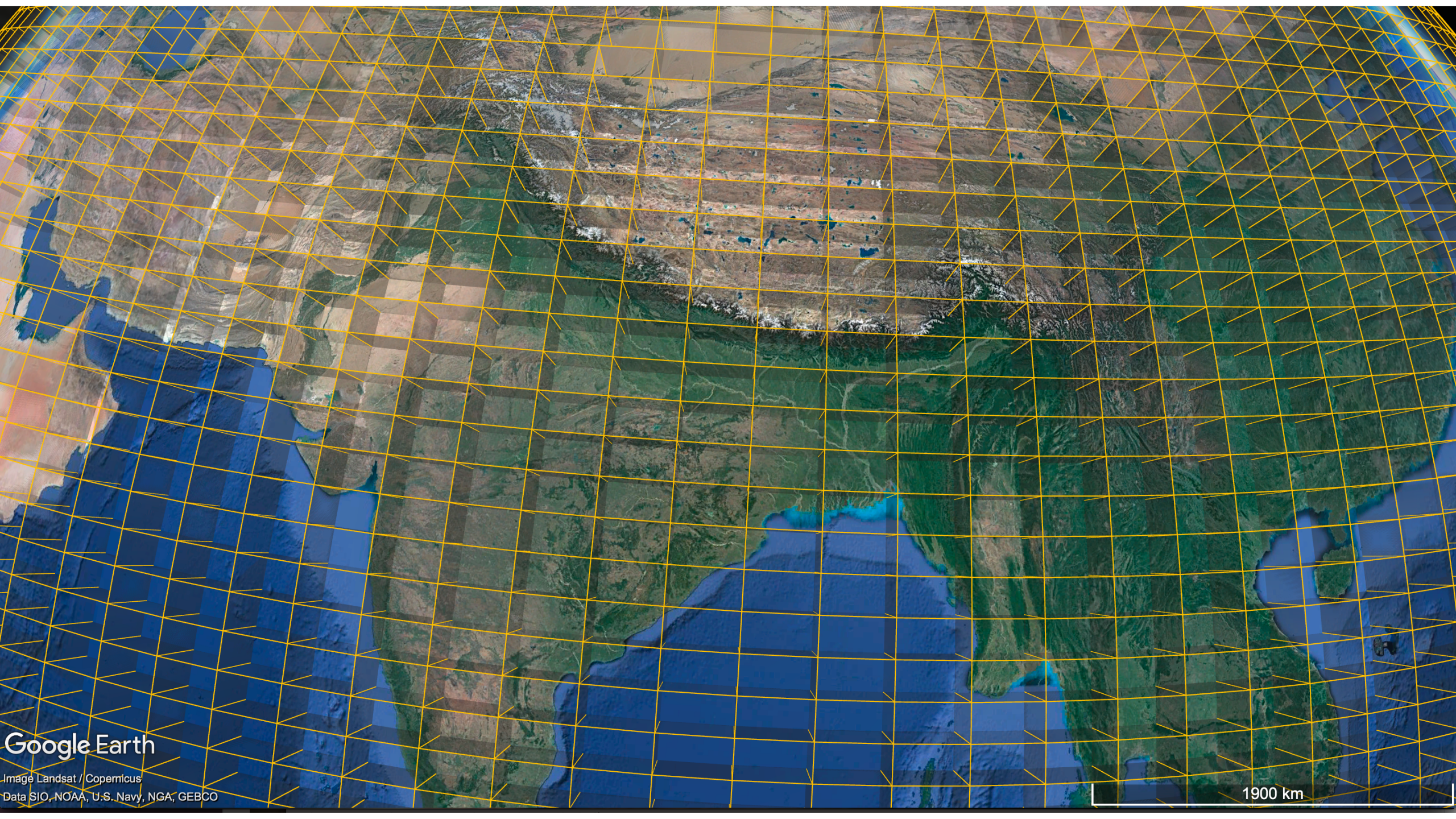
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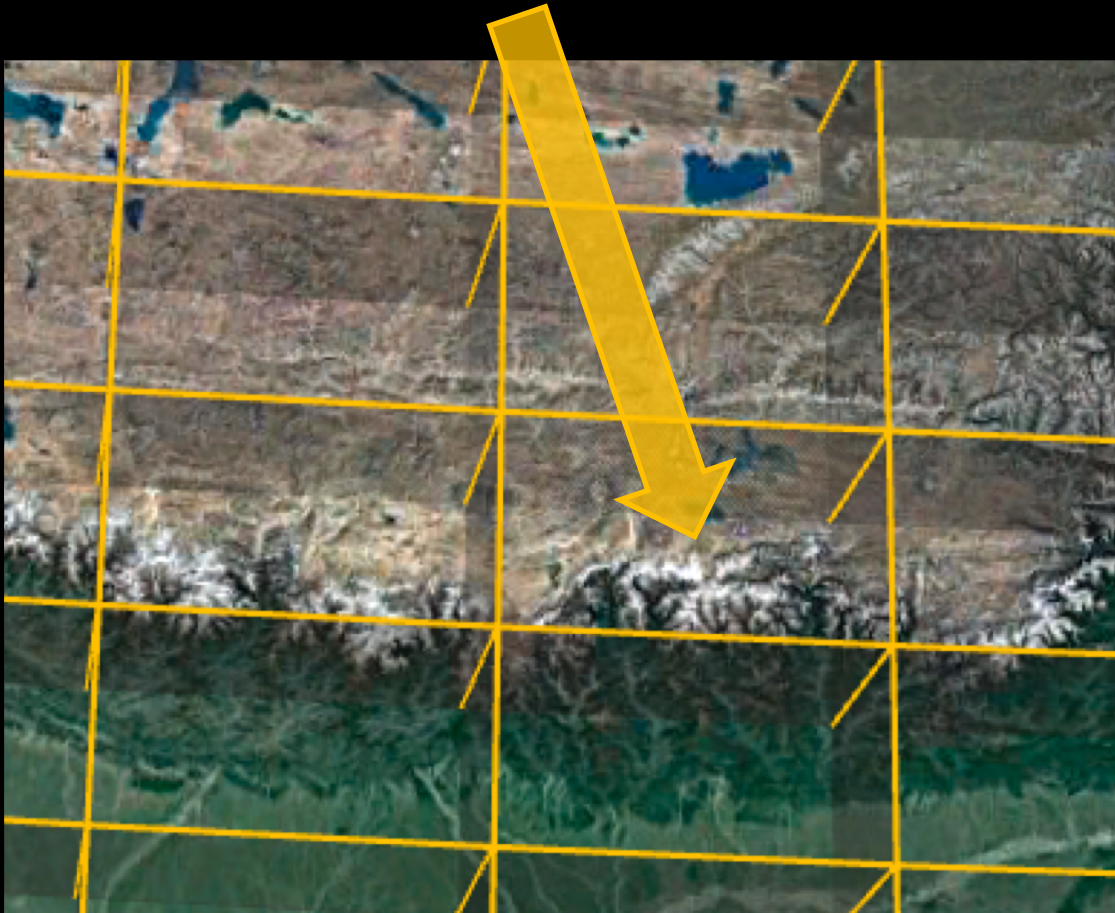


Google Earth

Image Landsat / Copernicus
Data SIO, NOAA, U.S. Navy, NGA, GEBCO

1900 km

- Mean slope
- Highest elevation (peaks)
- Lowest altitude (valleys)
- Standard deviation



A new subgrid-scale orographic drag parametrization: Its formulation and testing

By FRANÇOIS LOTT and MARTIN J. MILLER*
European Centre for Medium-Range Weather Forecasts, UK

OROGRAPHIC DRAG

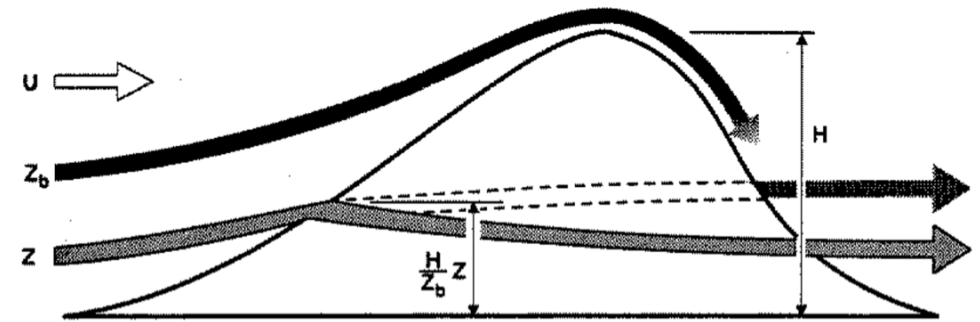
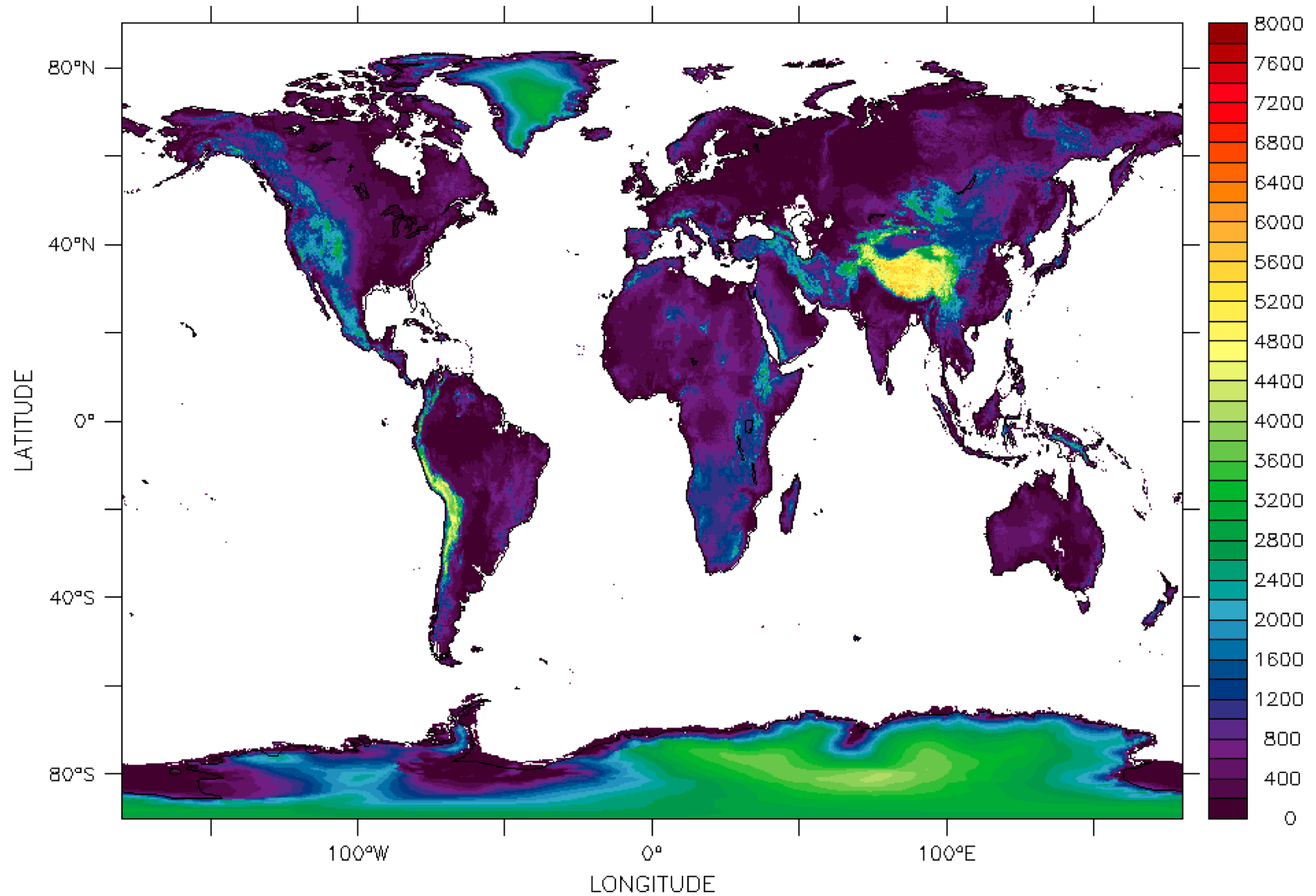


Figure 1. Schematic representation of the low-level flow behaviour parametrized in the new scheme (see text for details).

Relief.nc
10'
elevation
dataset



Relief.nc

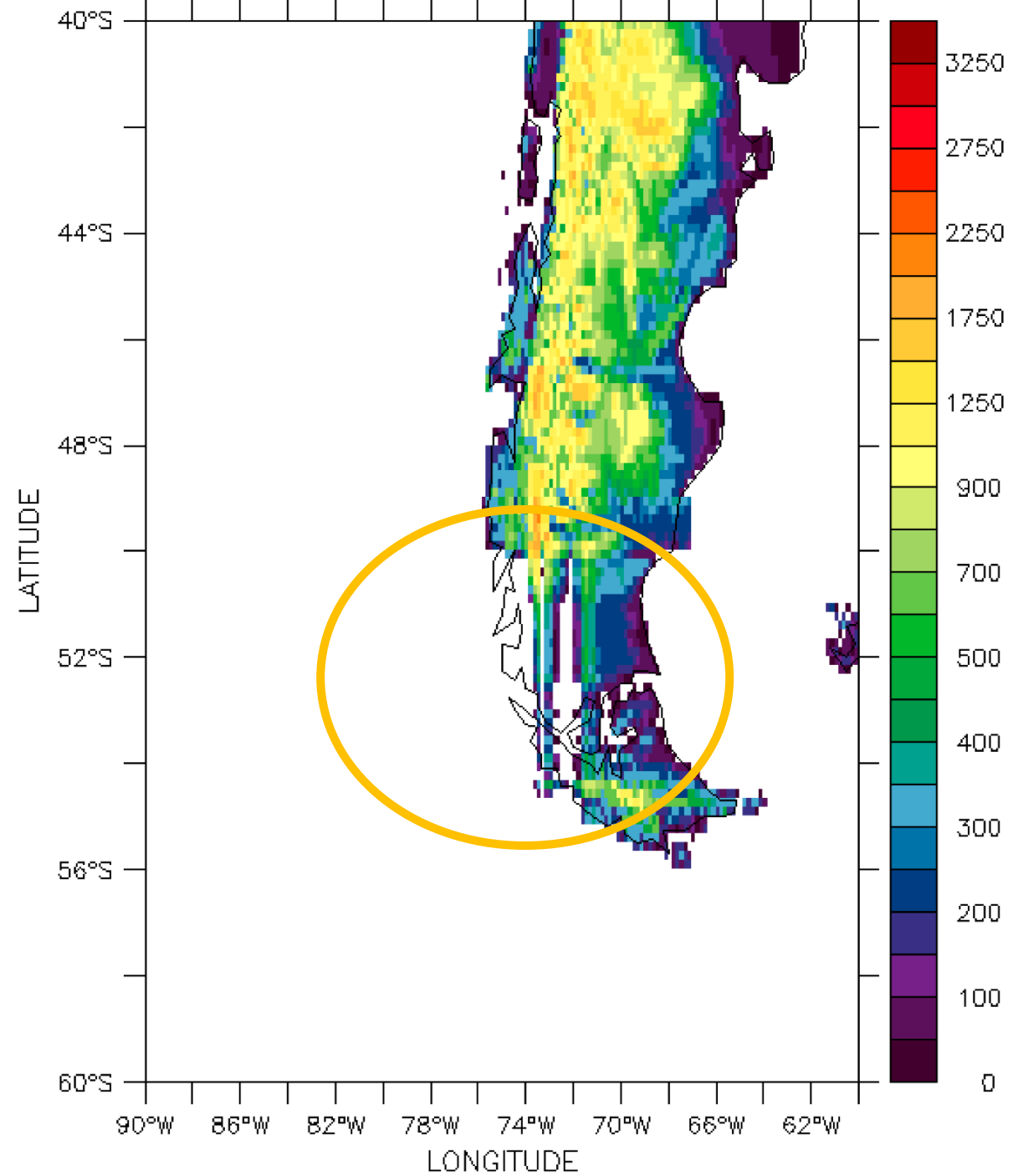
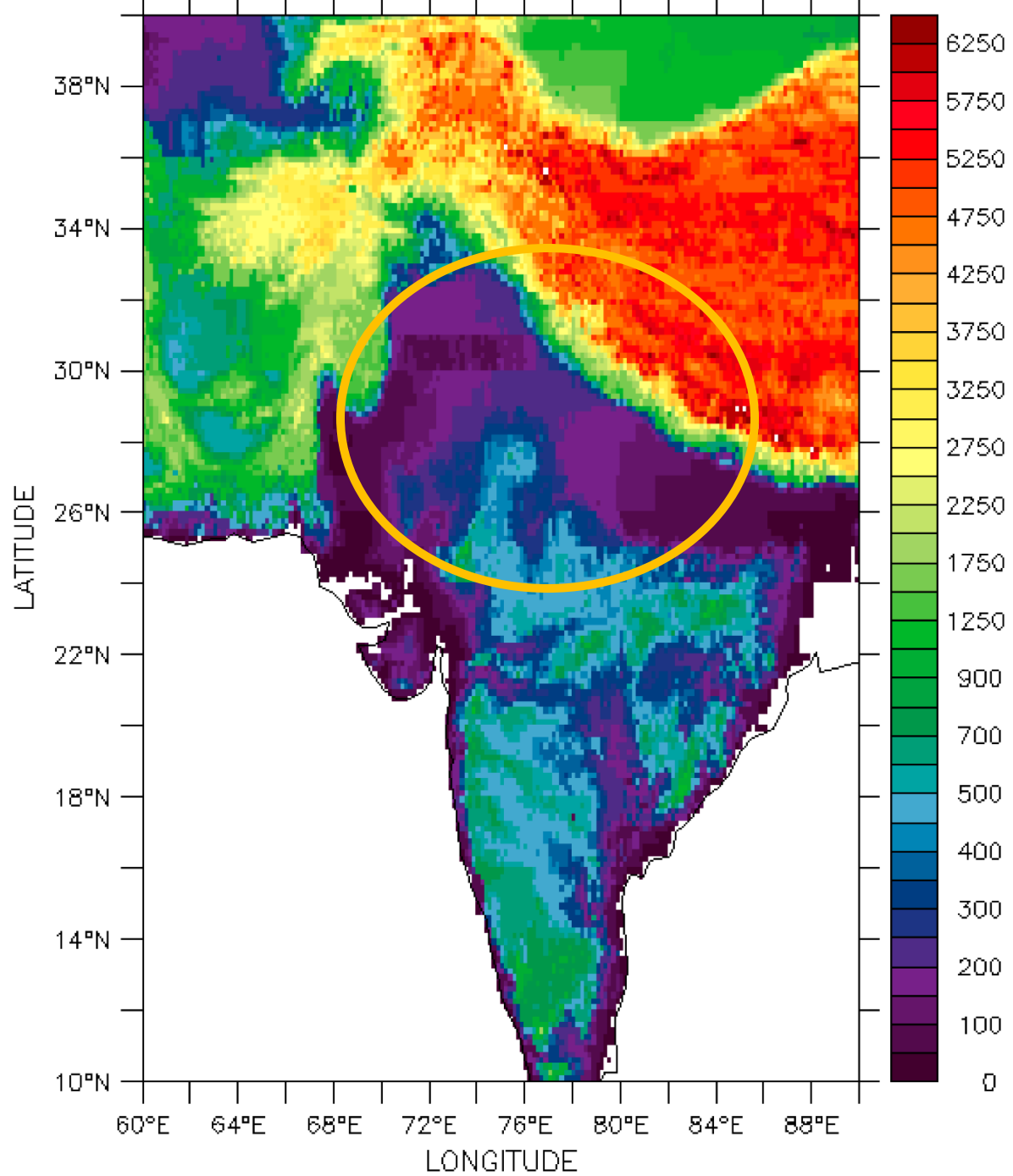
- Origin ??
- Joseph, 1980, Navy 10' global elevation values -- National Center for Atmospheric Research notes on the Fleet Numerical Weather Center terrain data set

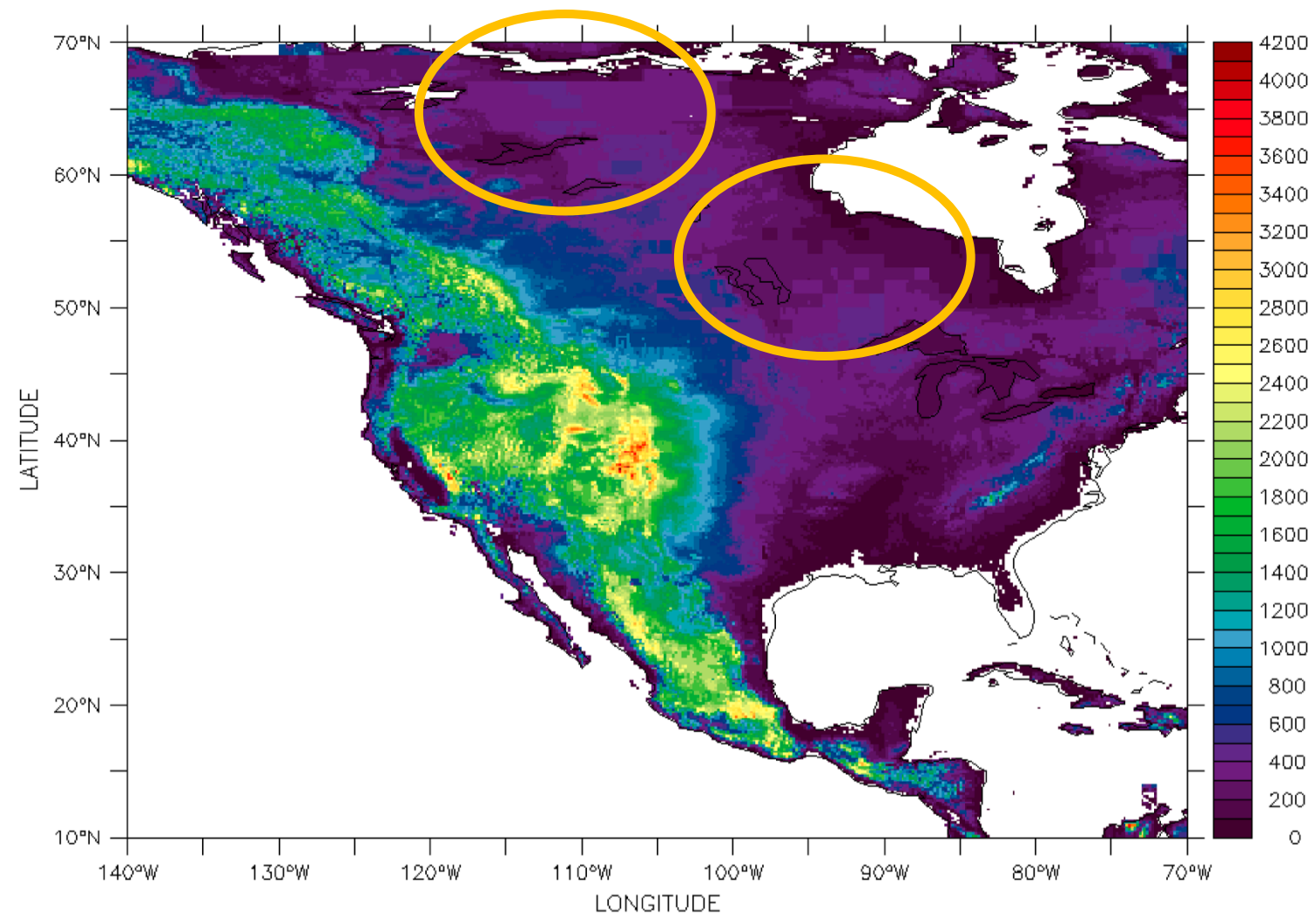
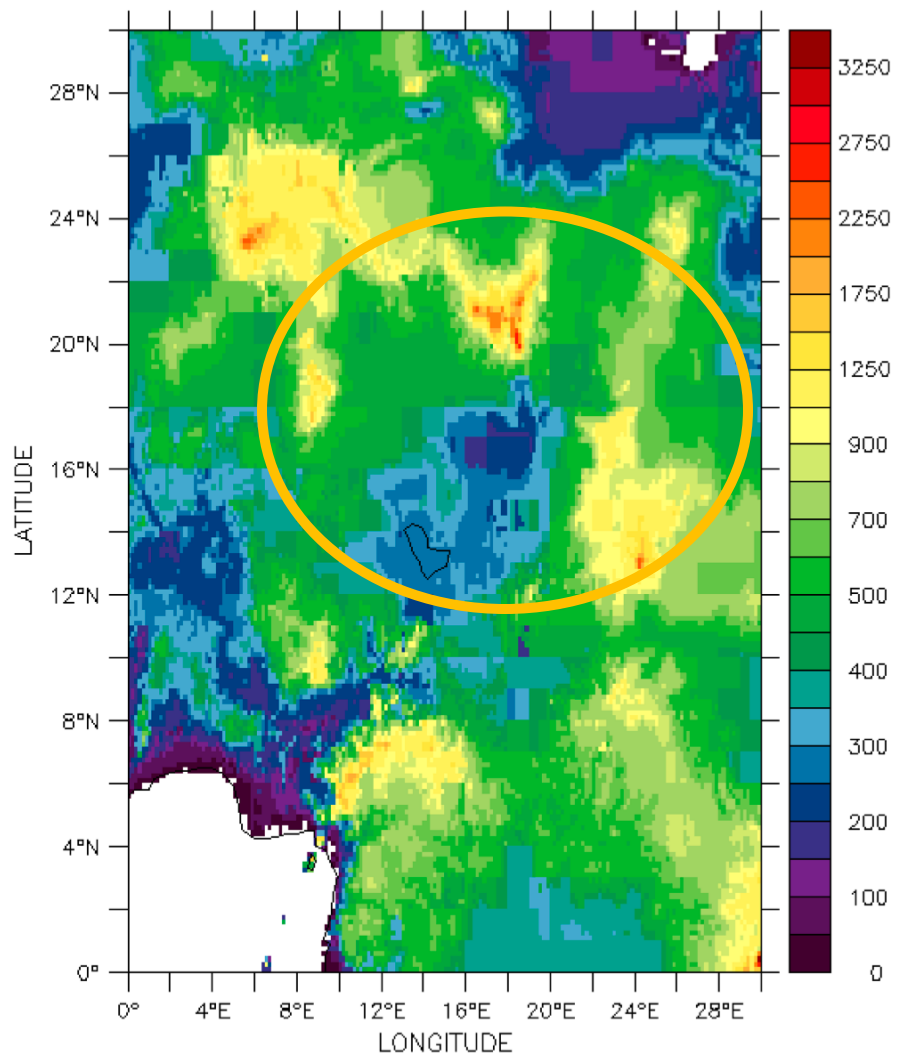
[...] originally created by the United States Navy, Fleet Numeric Oceanography Center (FNOC) in the 1960s and 1970s

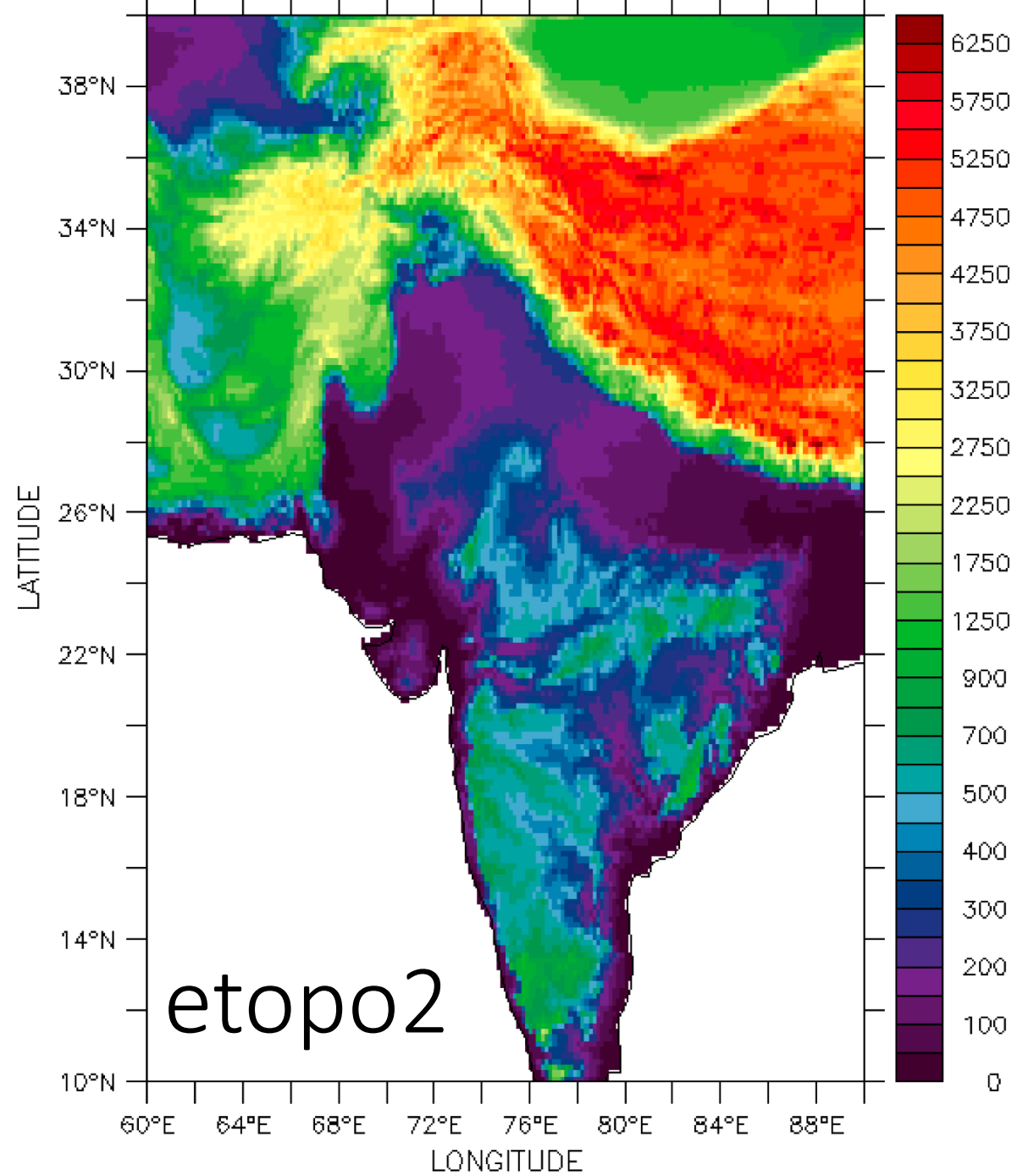
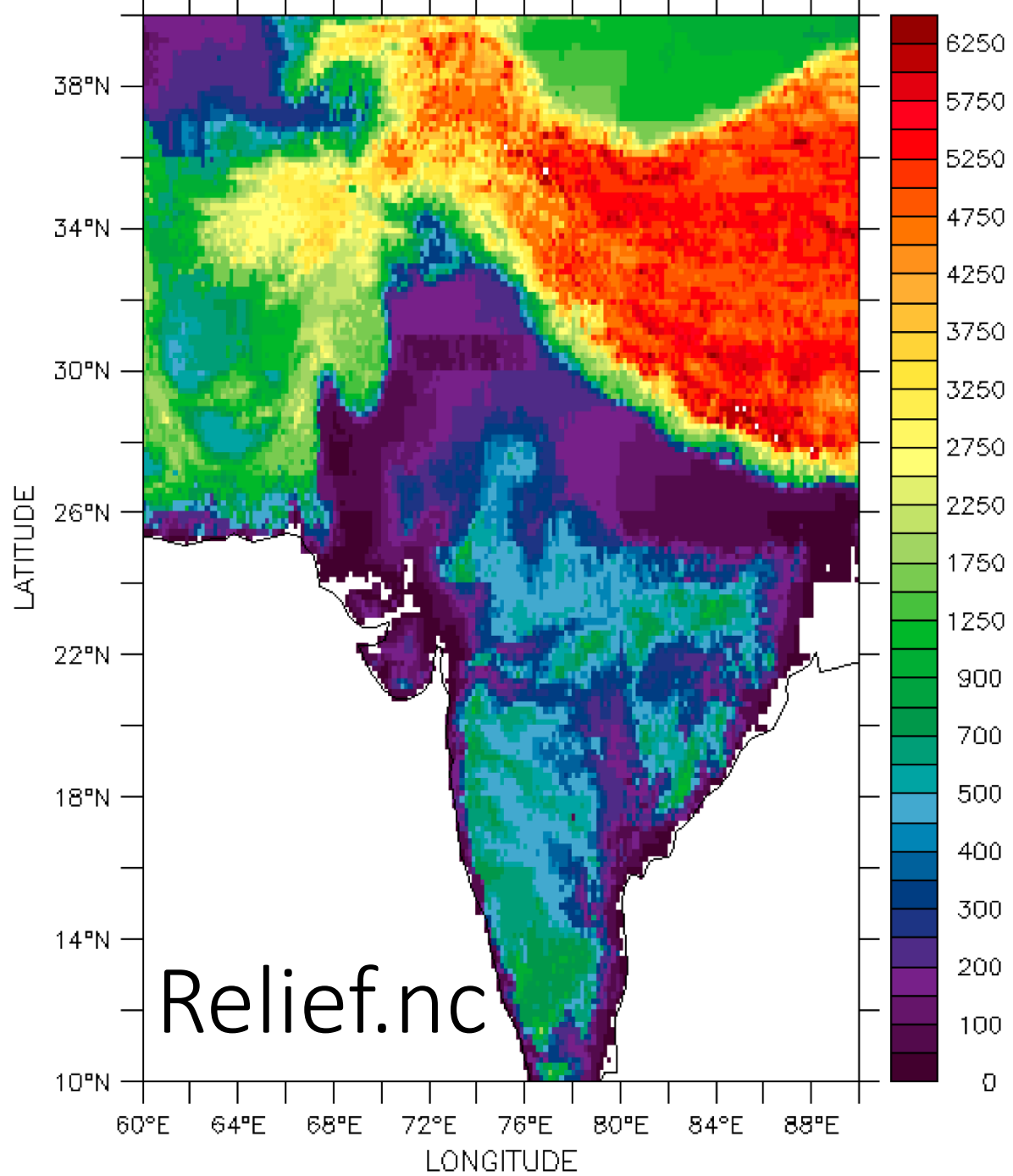
[...] entailed manually extracting elevations from small-scale navigational charts and subsequently converting the values into a digital format [...] Elevation values were visually estimated from topographic contours on the charts for 10 x 10-minute coordinate areas. Values were hand written onto forms and later scanned by an optical character reader for computer storage of the data.

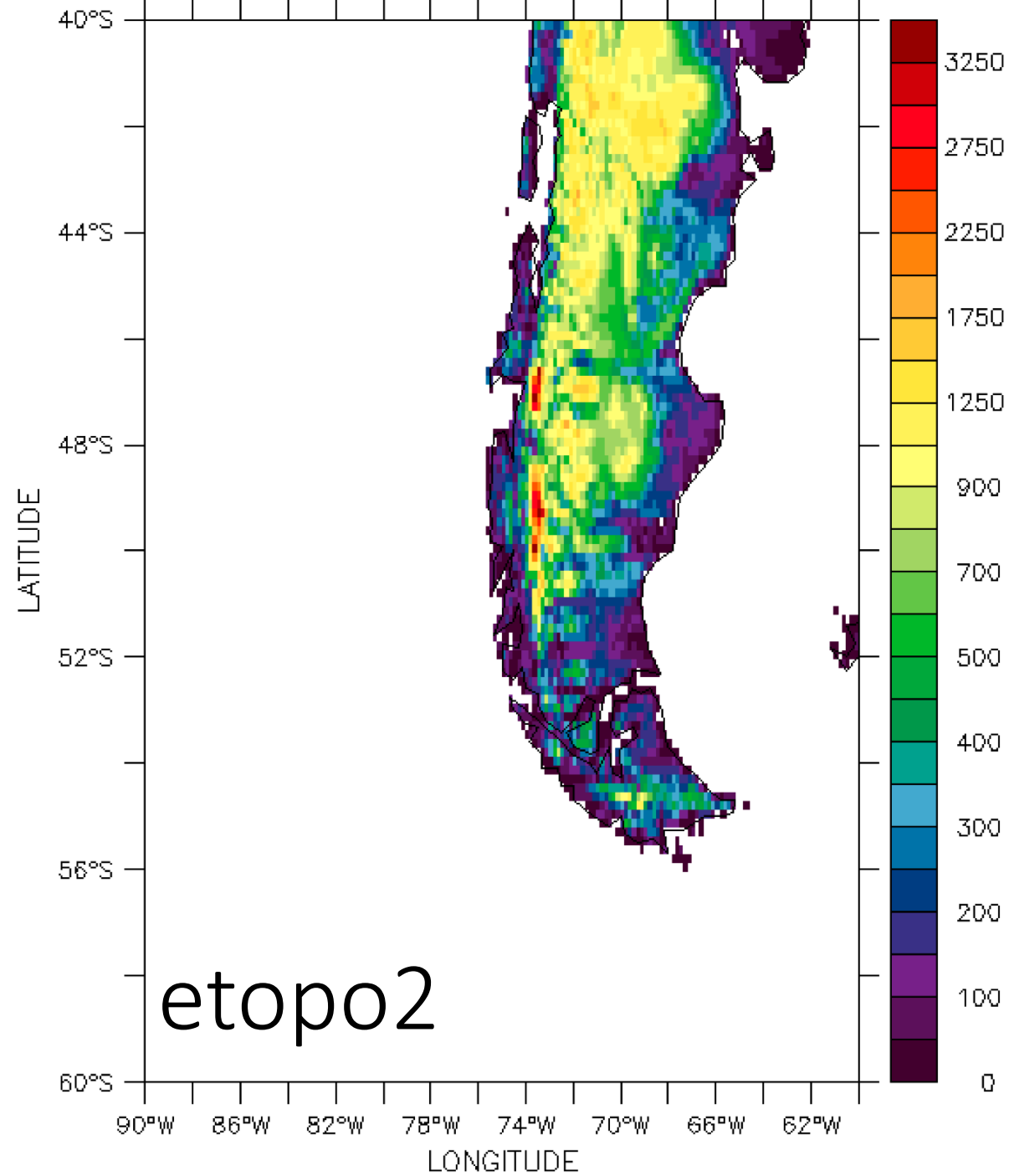
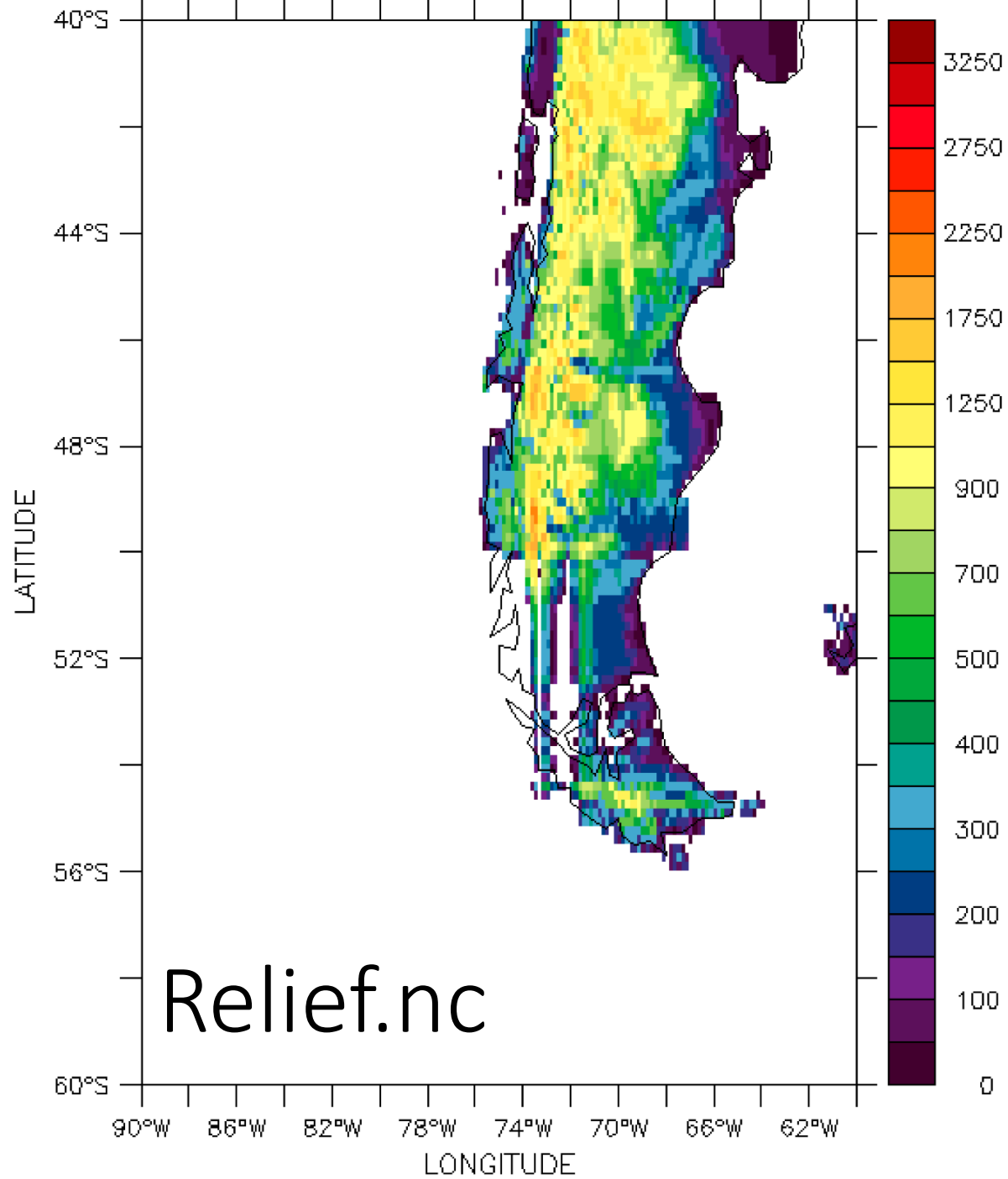
[...] In the 1980s, the National Center for Atmospheric Research conducted tests on the modal elevation values to locate additional errors.

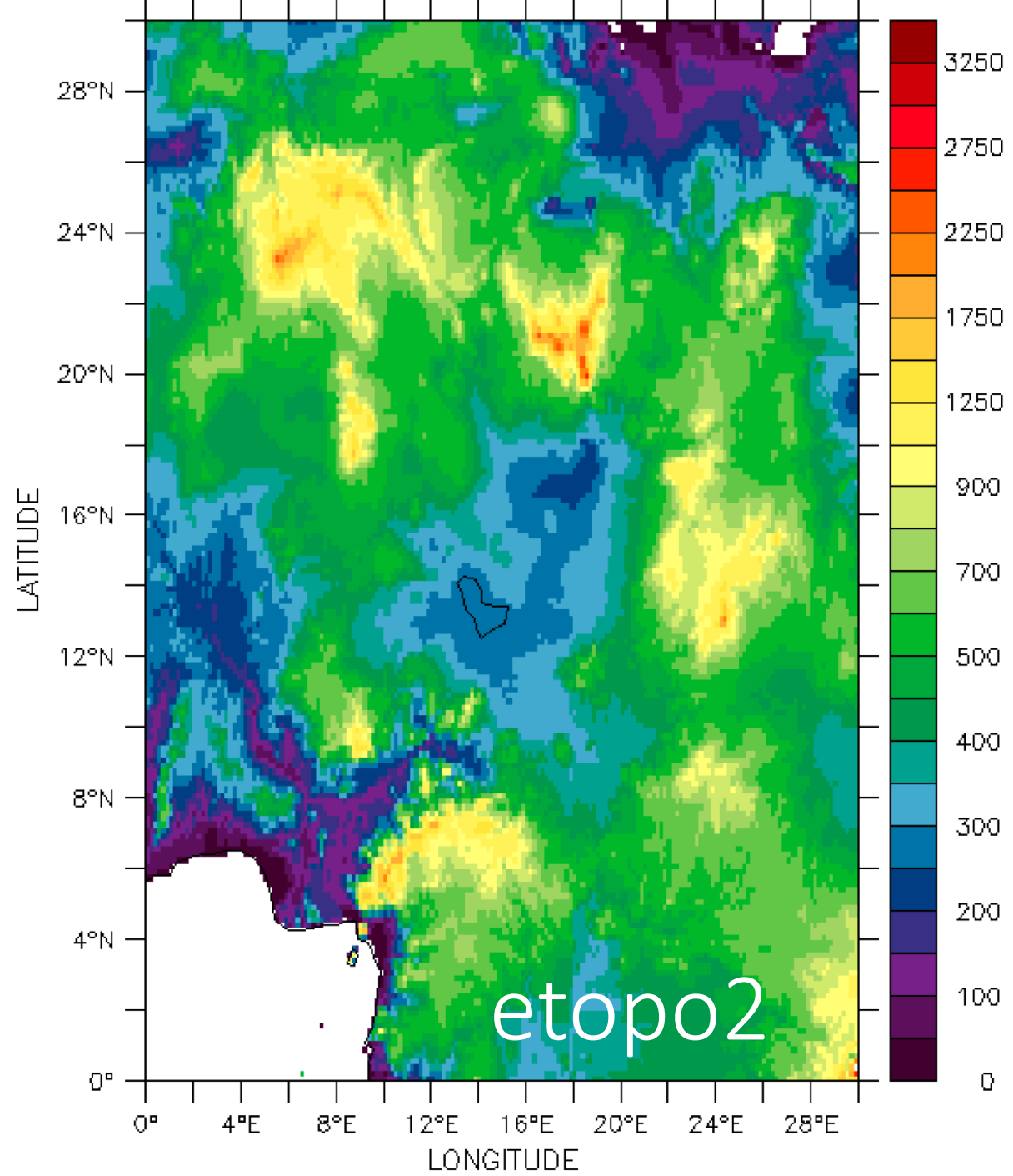
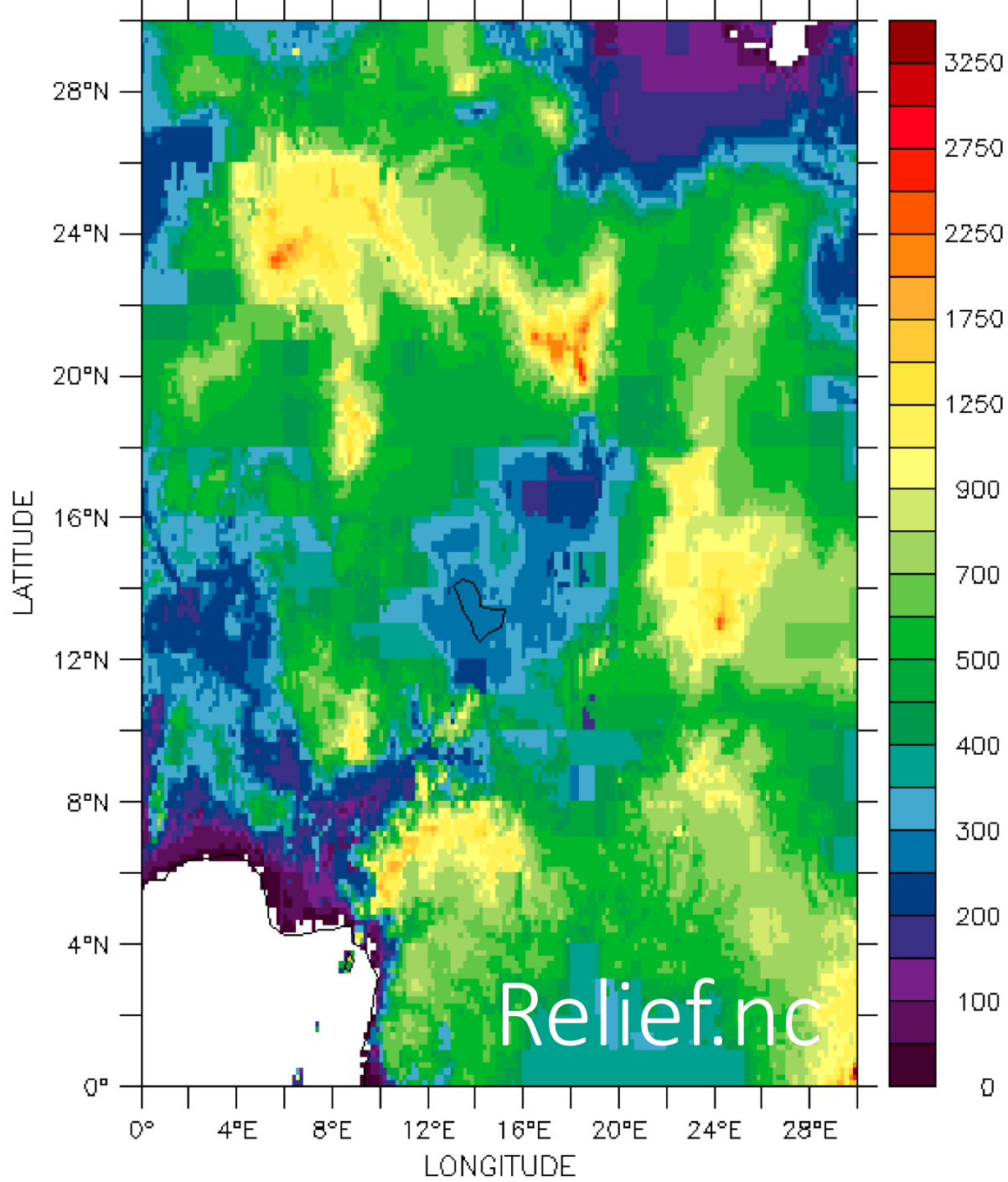
[...] In 1984, NGDC analyzed the data for any remaining significant errors. A few erroneous values were identified in the modal and minimum data. [...] Suspect values were compared with estimated values, and where the estimates seemed better than the original values, they were inserted into the data set.

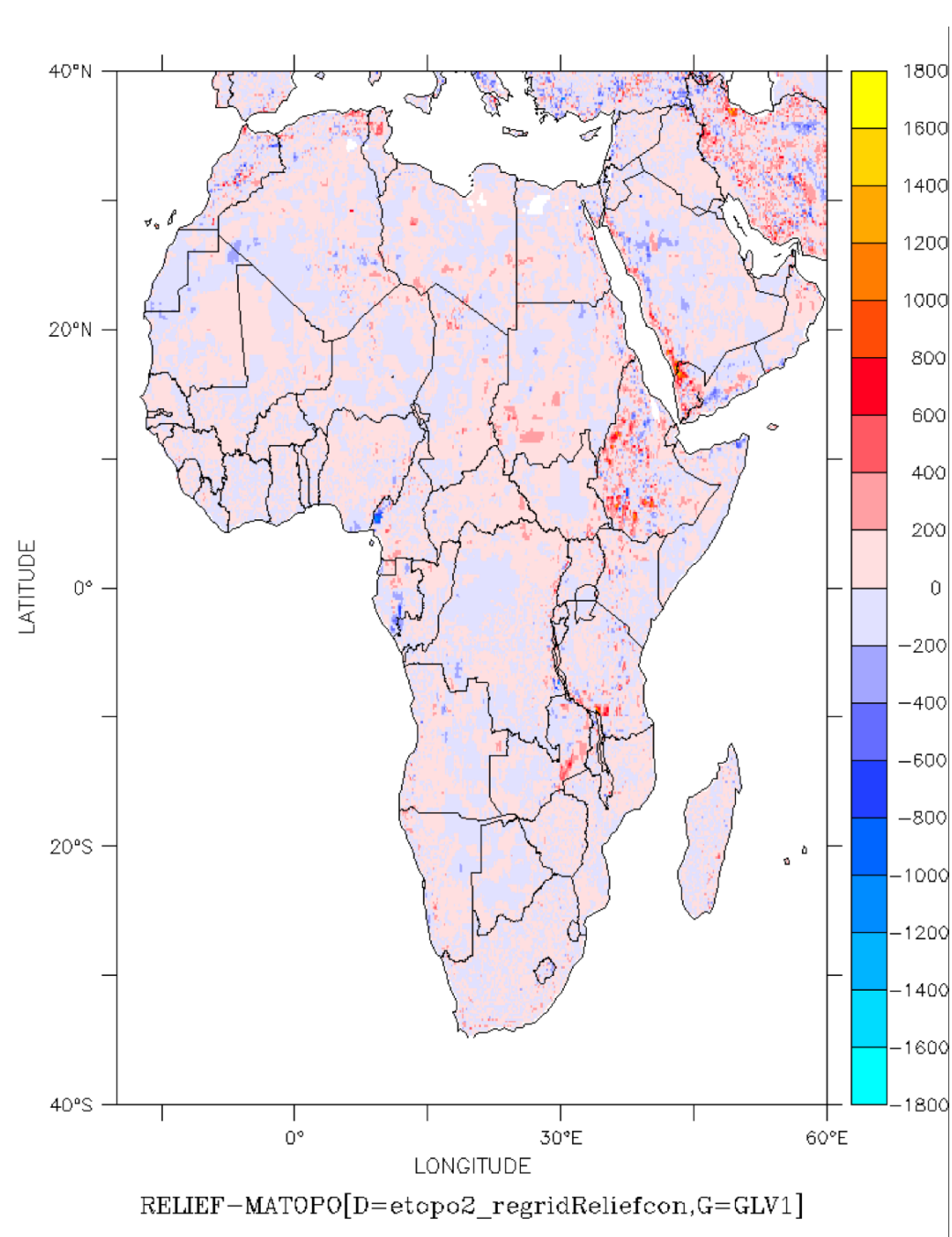
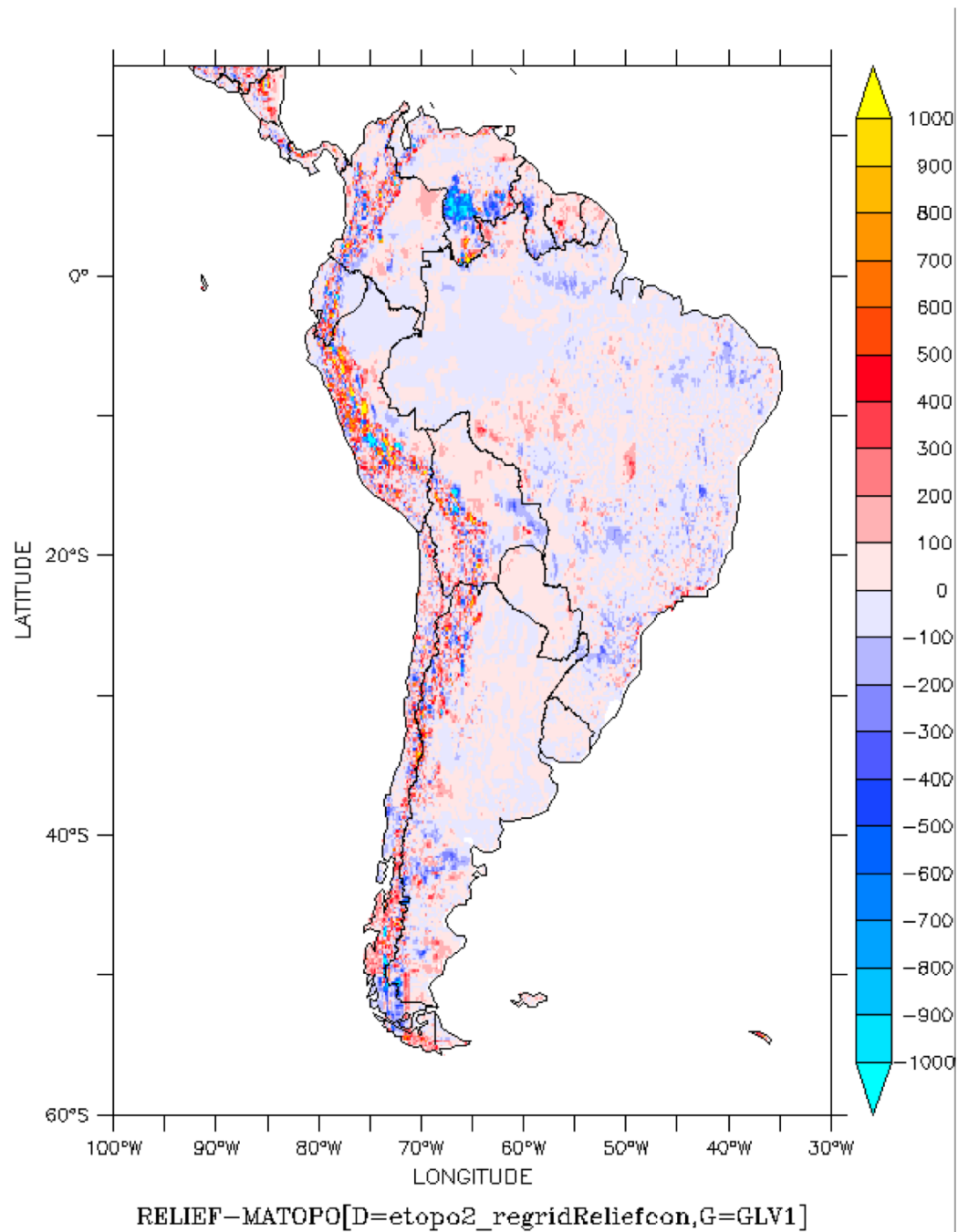


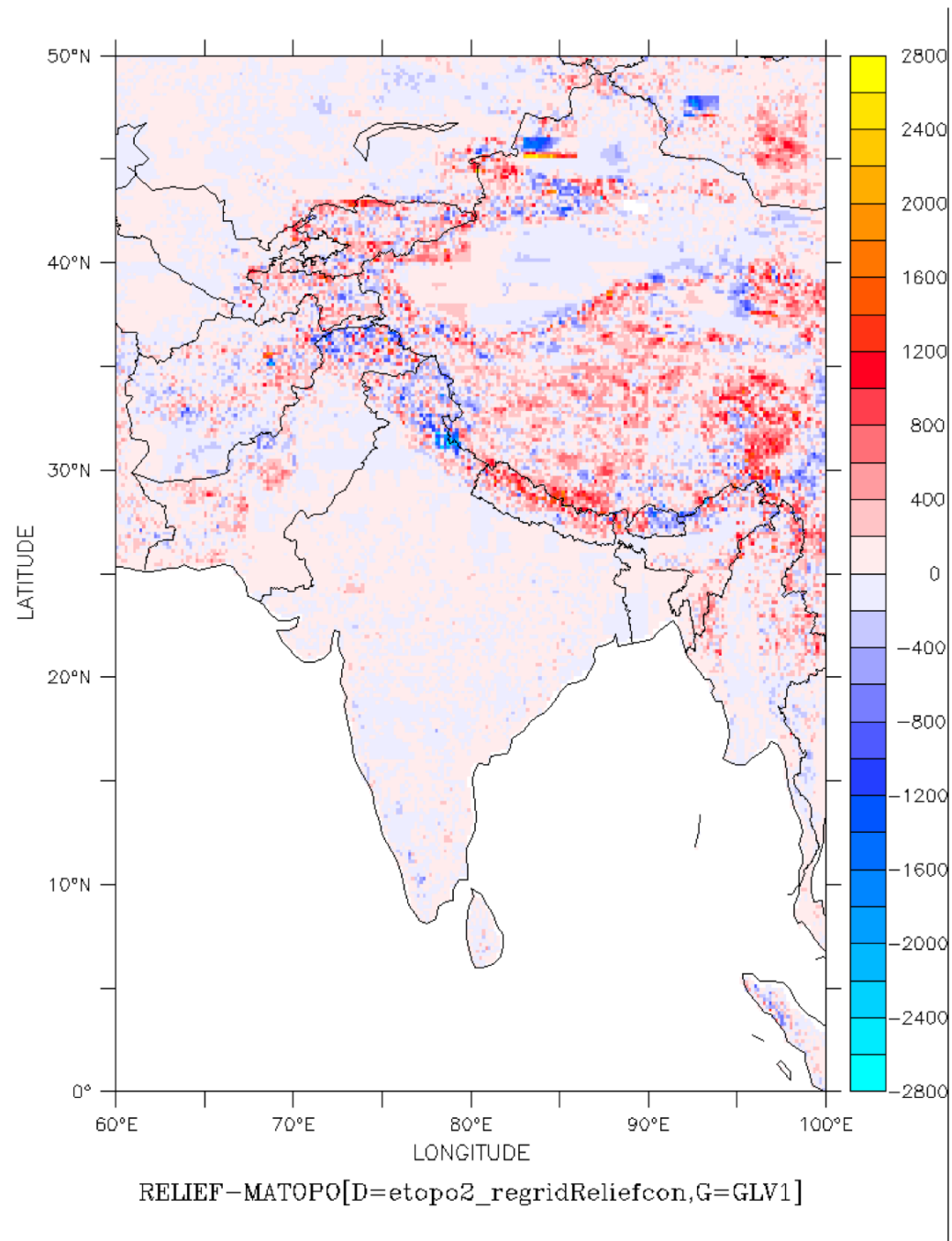






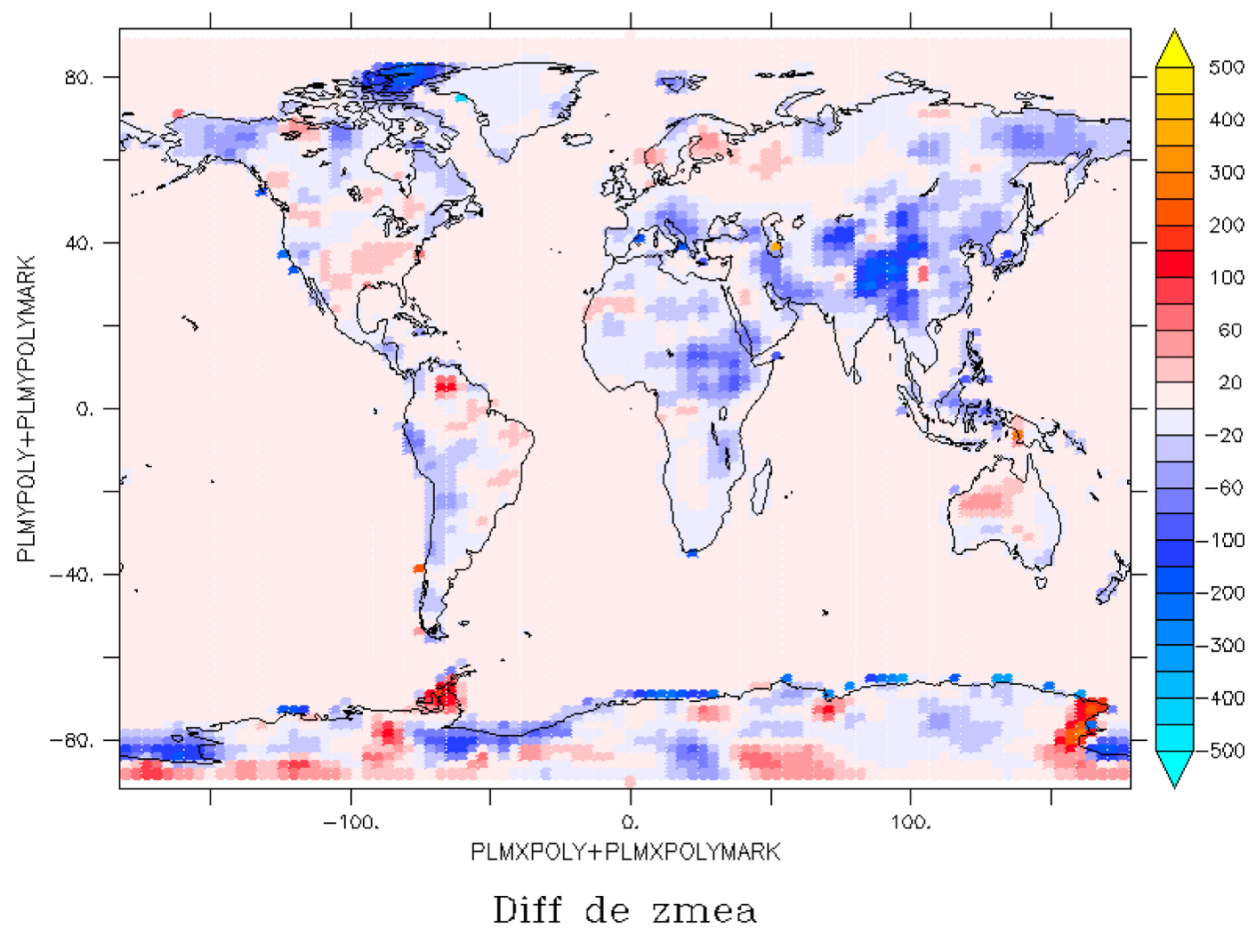




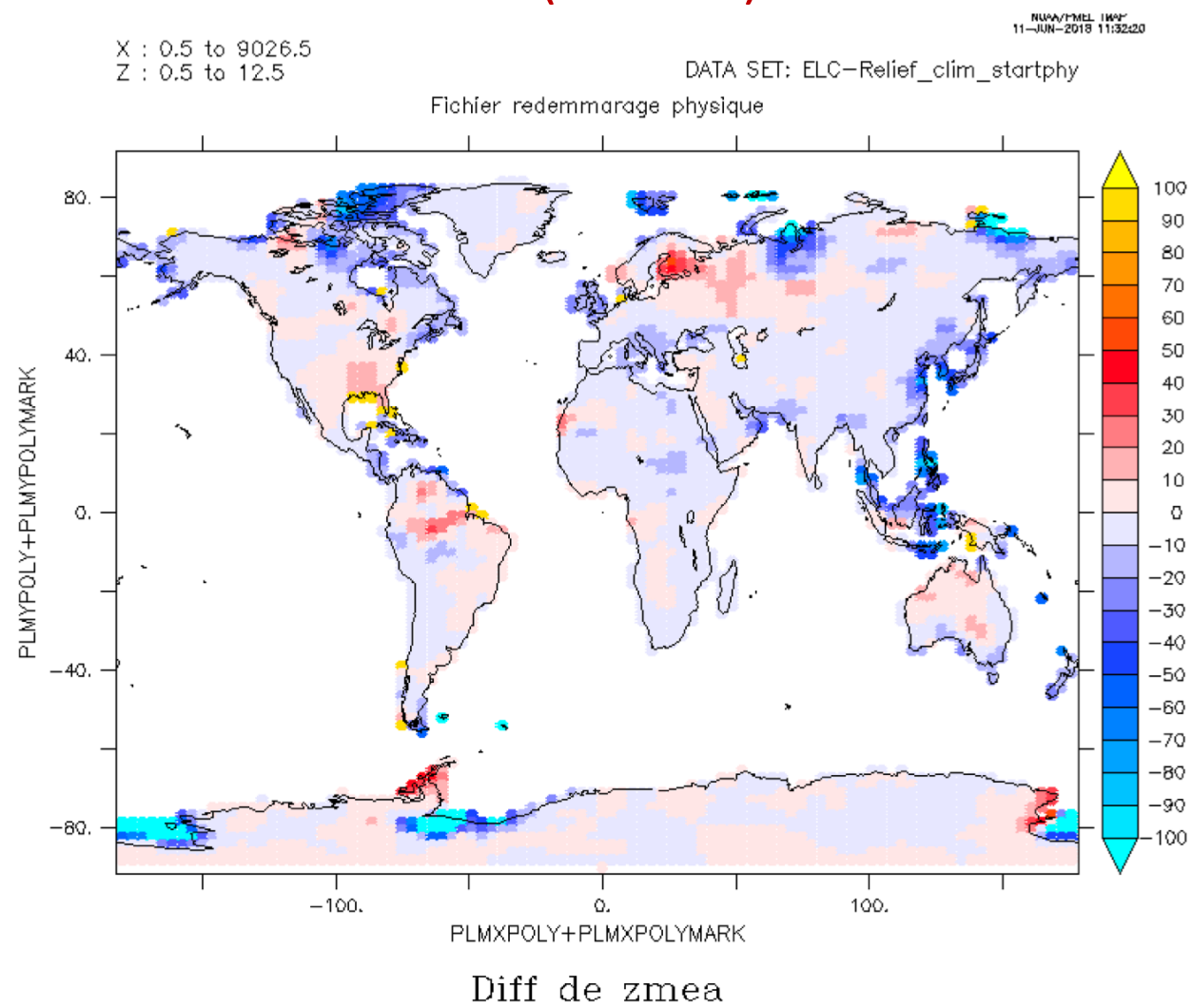


Relief	etopo2
Relief.nc	Etopo2 reinterpolated (bilinear using cdo)
LMDZ5 rev2875	
ORCHIDEE rev 4441	
Classic Pre-industrial run (50 years)	

Mean elevation : etopo2- Relief (absolute values)



Mean elevation : etopo2- Relief (relative)

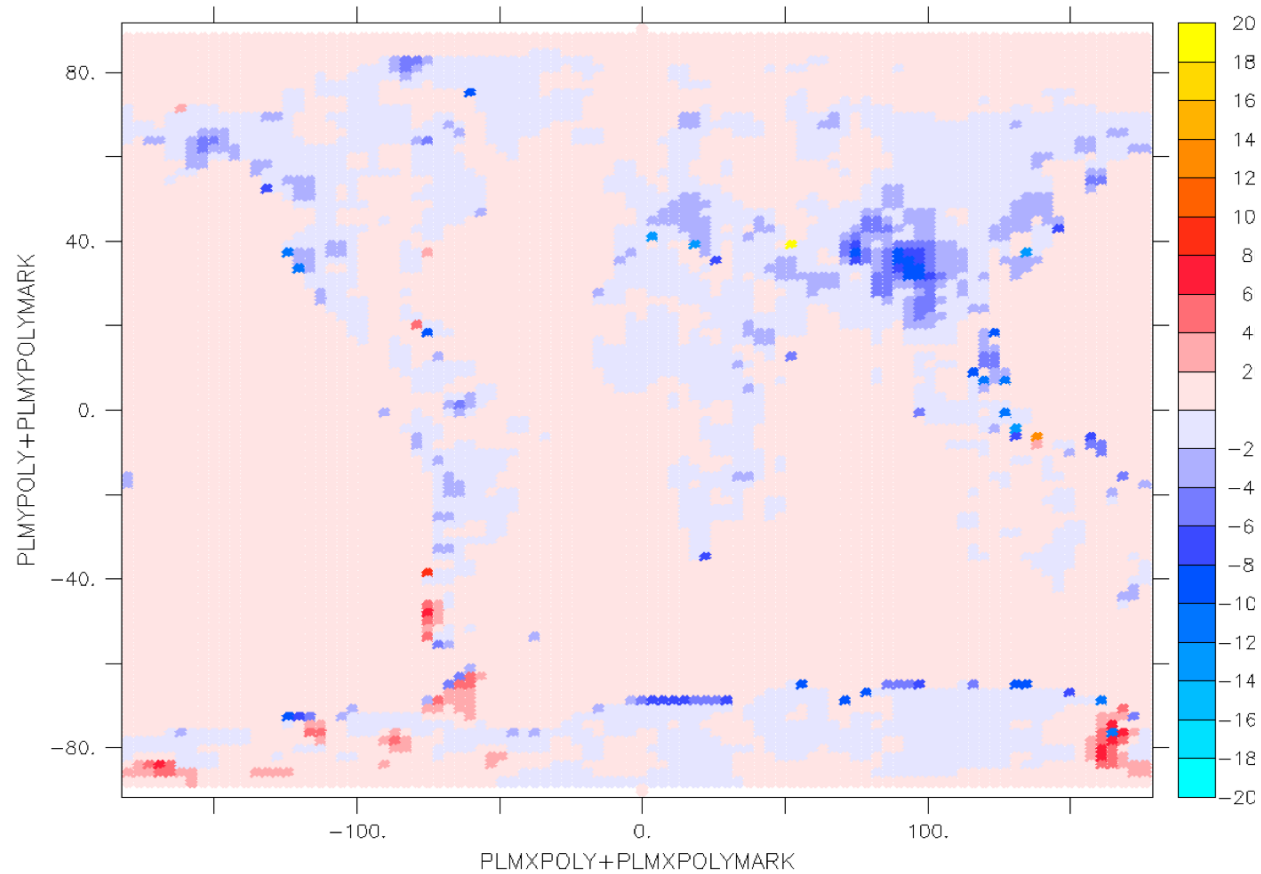


X : 0.5 to 9026.5
Z : 0.5 to 12.5

NOAA/PMEL IMAP
08-MAR-2018 12:56:10

DATA SET: ELC-96x95x39_clim_startphy

Fichier redemmarage physique



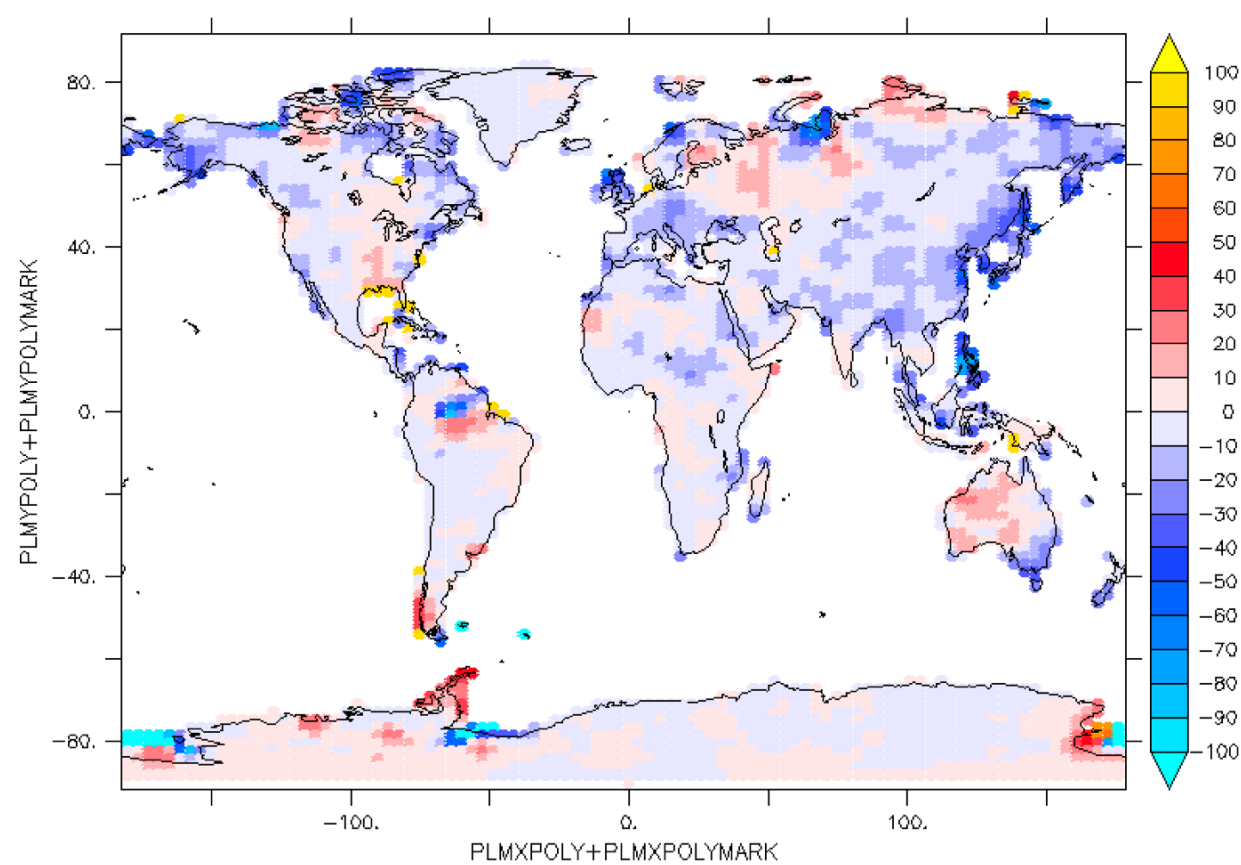
diff zpik

X : 0.5 to 9026.5
Z : 0.5 to 12.5

11-MAR-2018 11:20:00

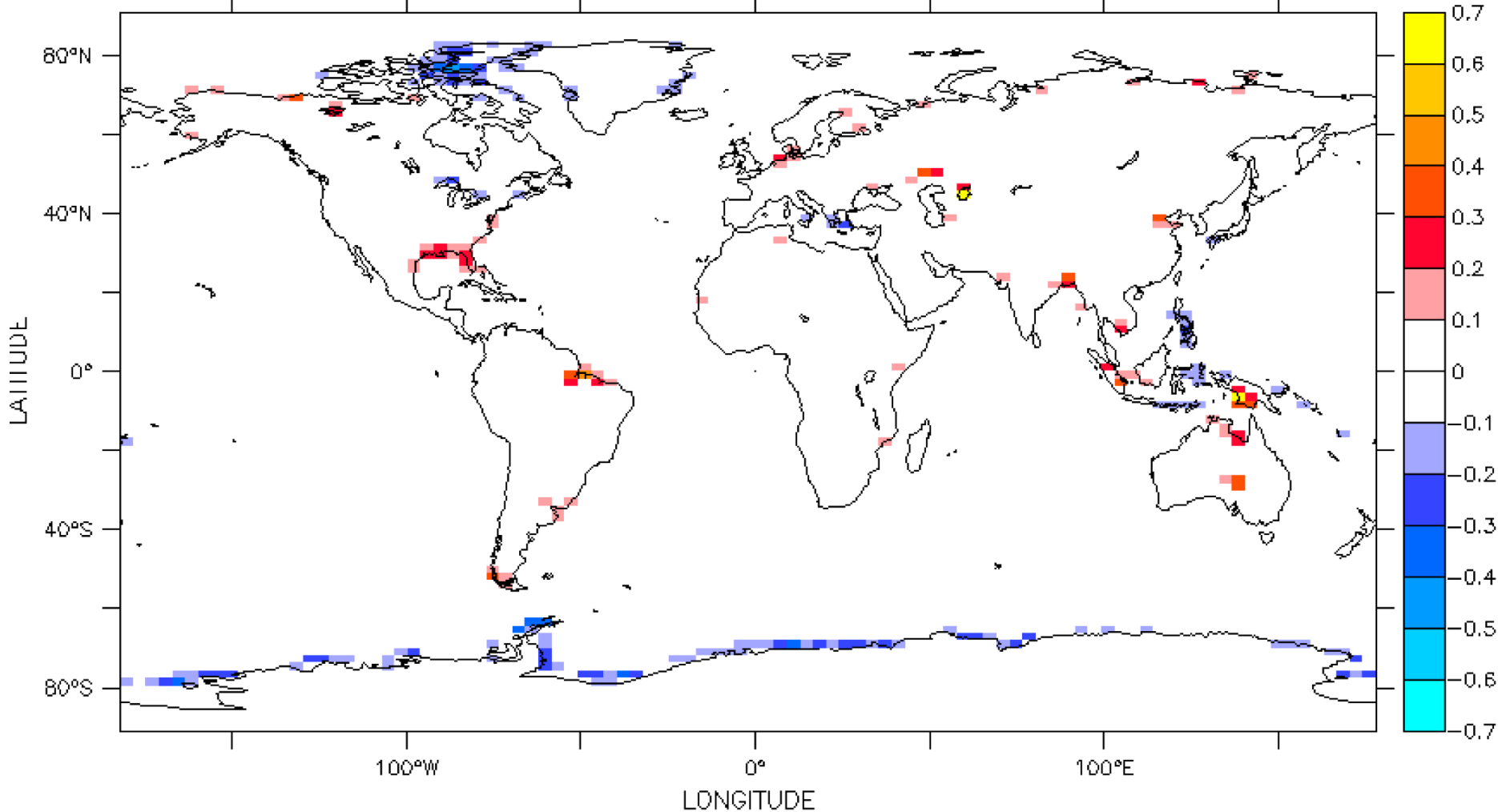
DATA SET: ELC-Relief_clim_startphy

Fichier redemmarage physique

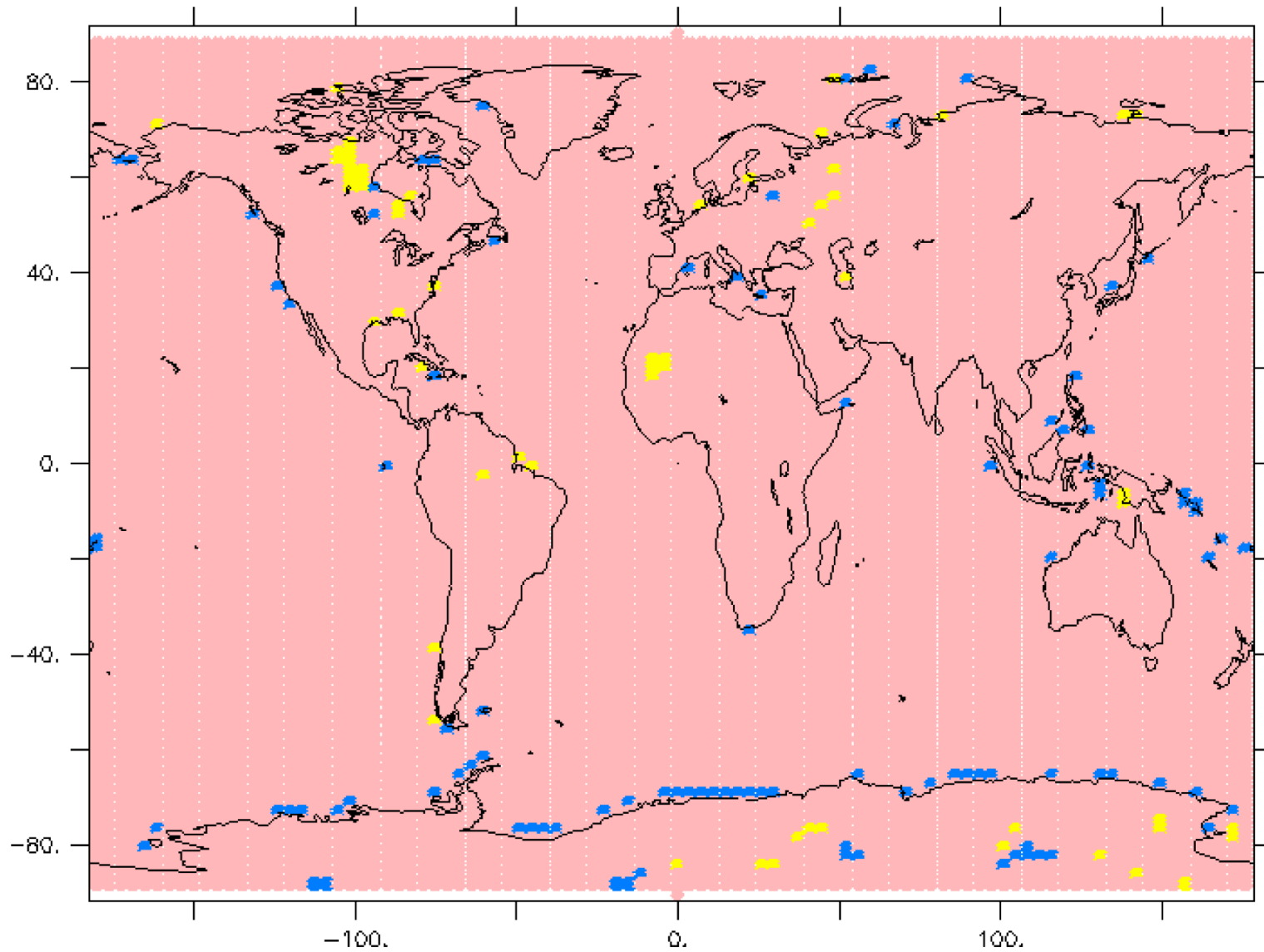


Diff de zpik

Fraction : etopo2-Relief
(absolute values)

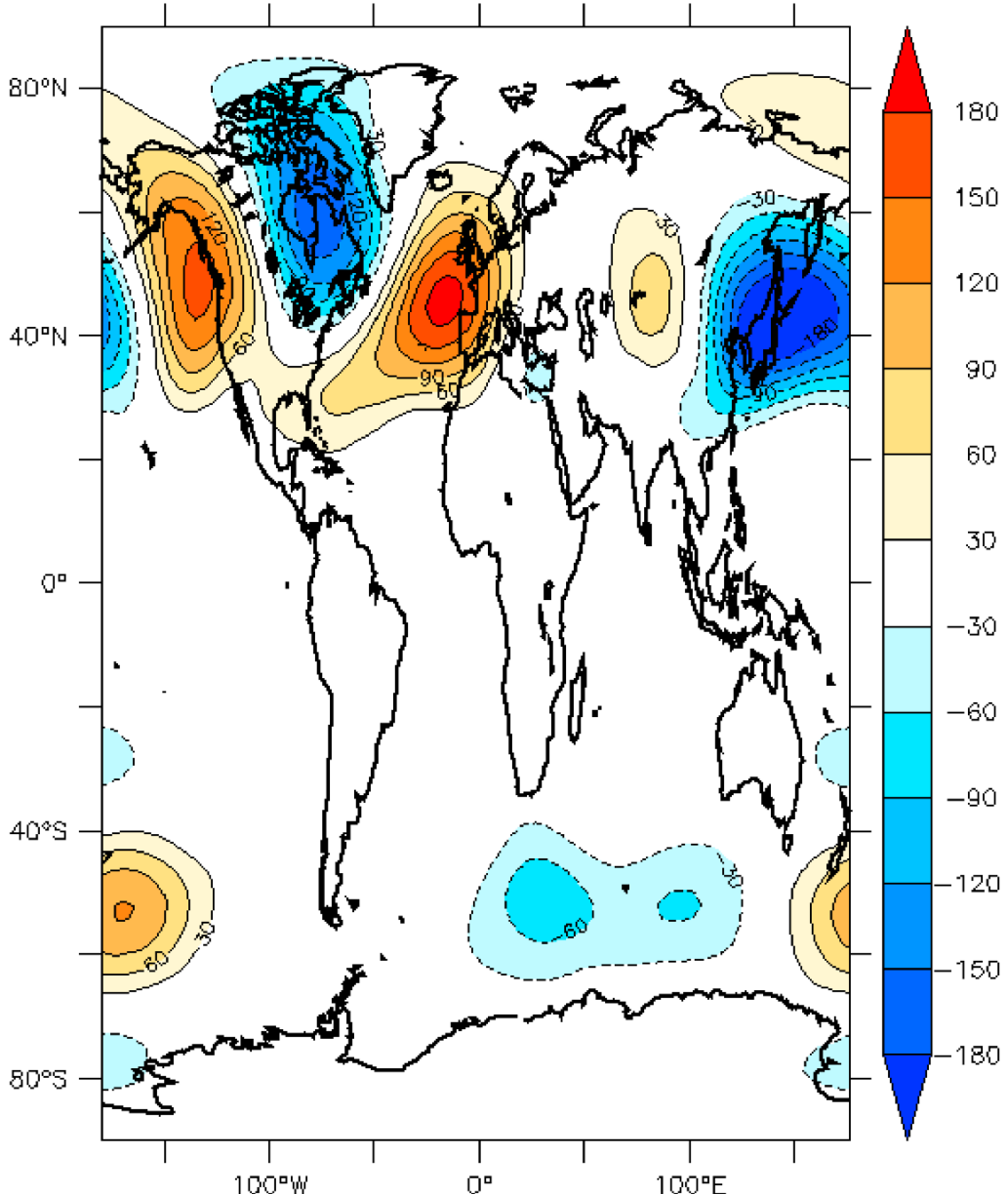


Where SSO is activated/unactivated

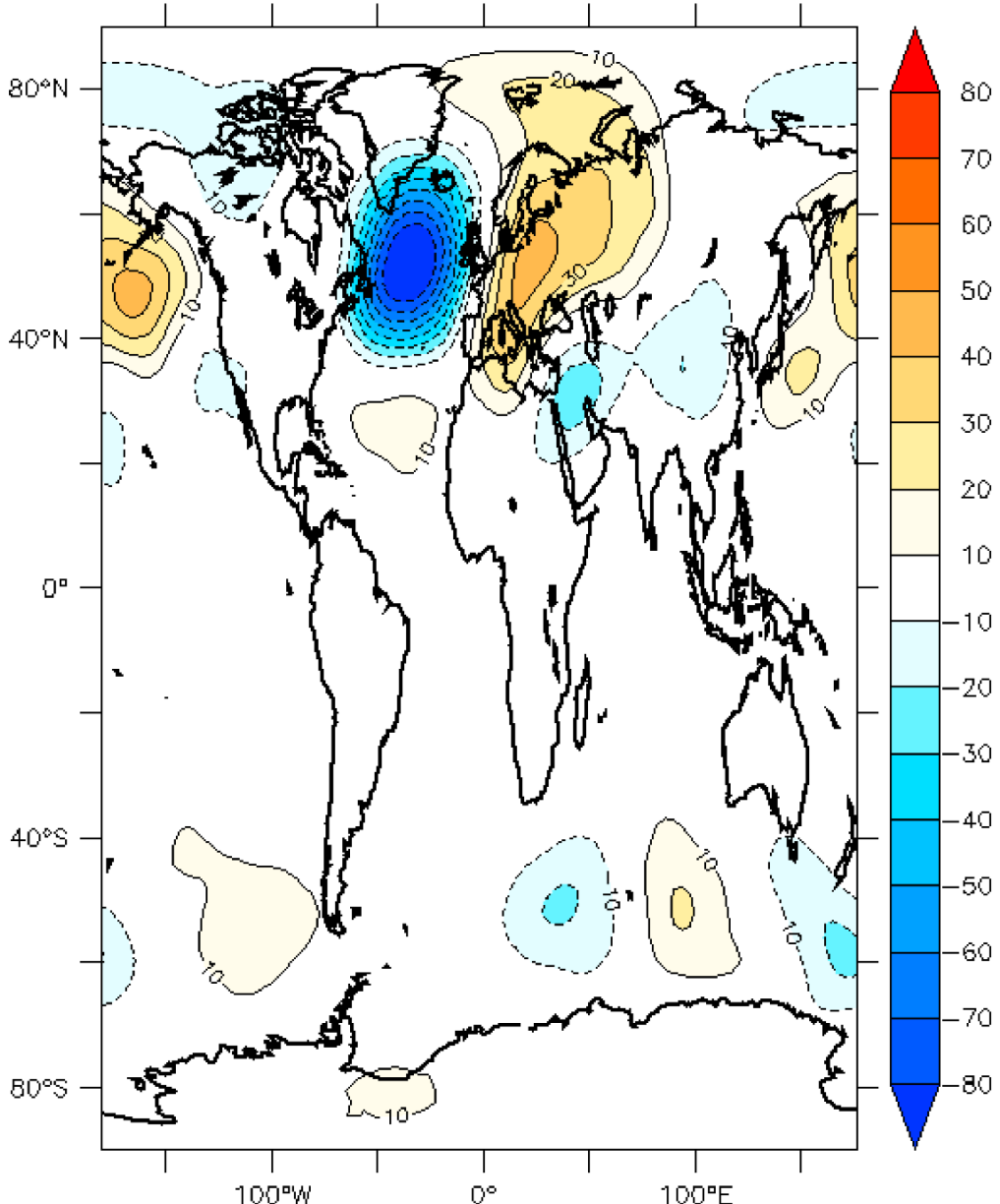


10-year averaged (year 11→20)

500hPa geop

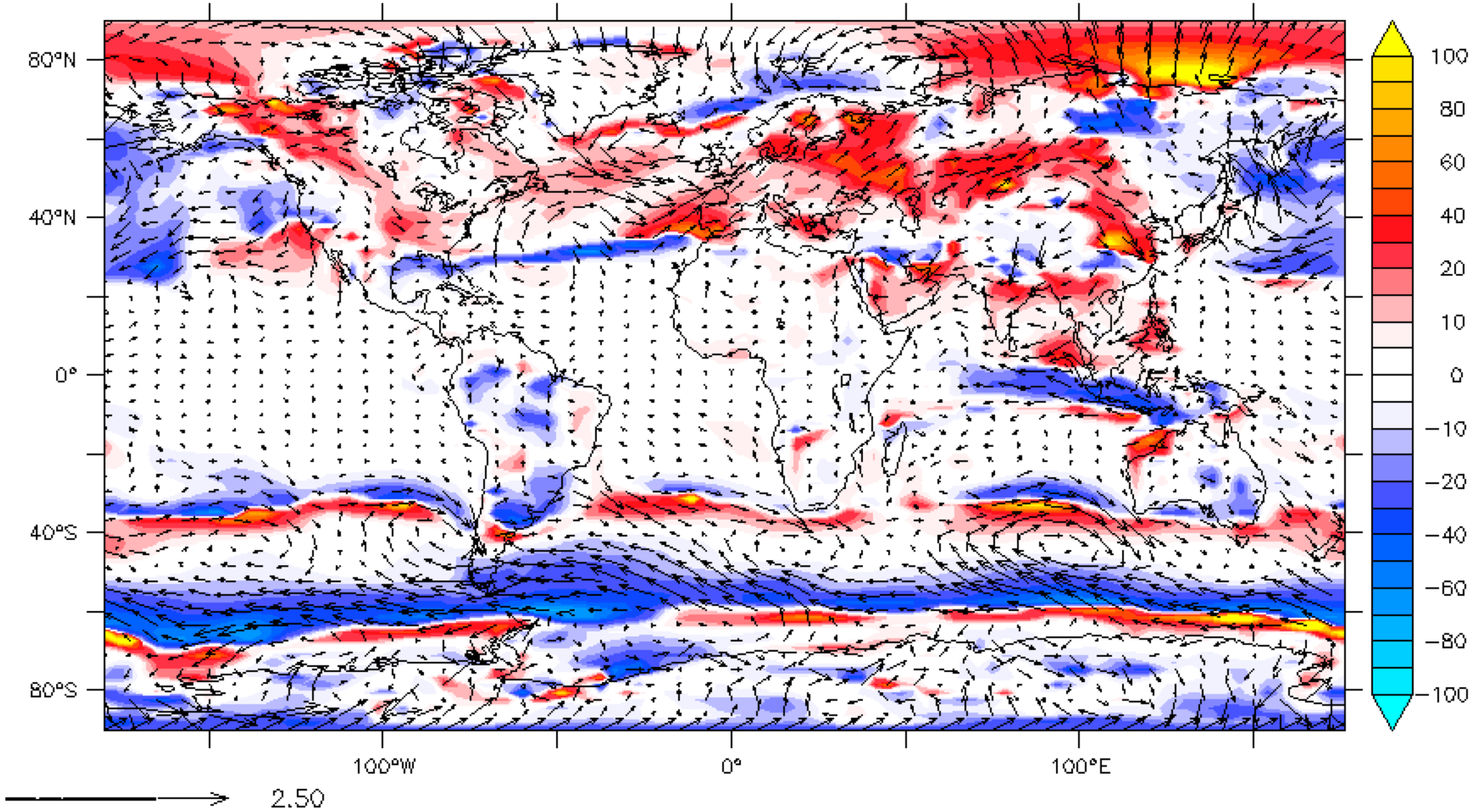


Etopo2-relief

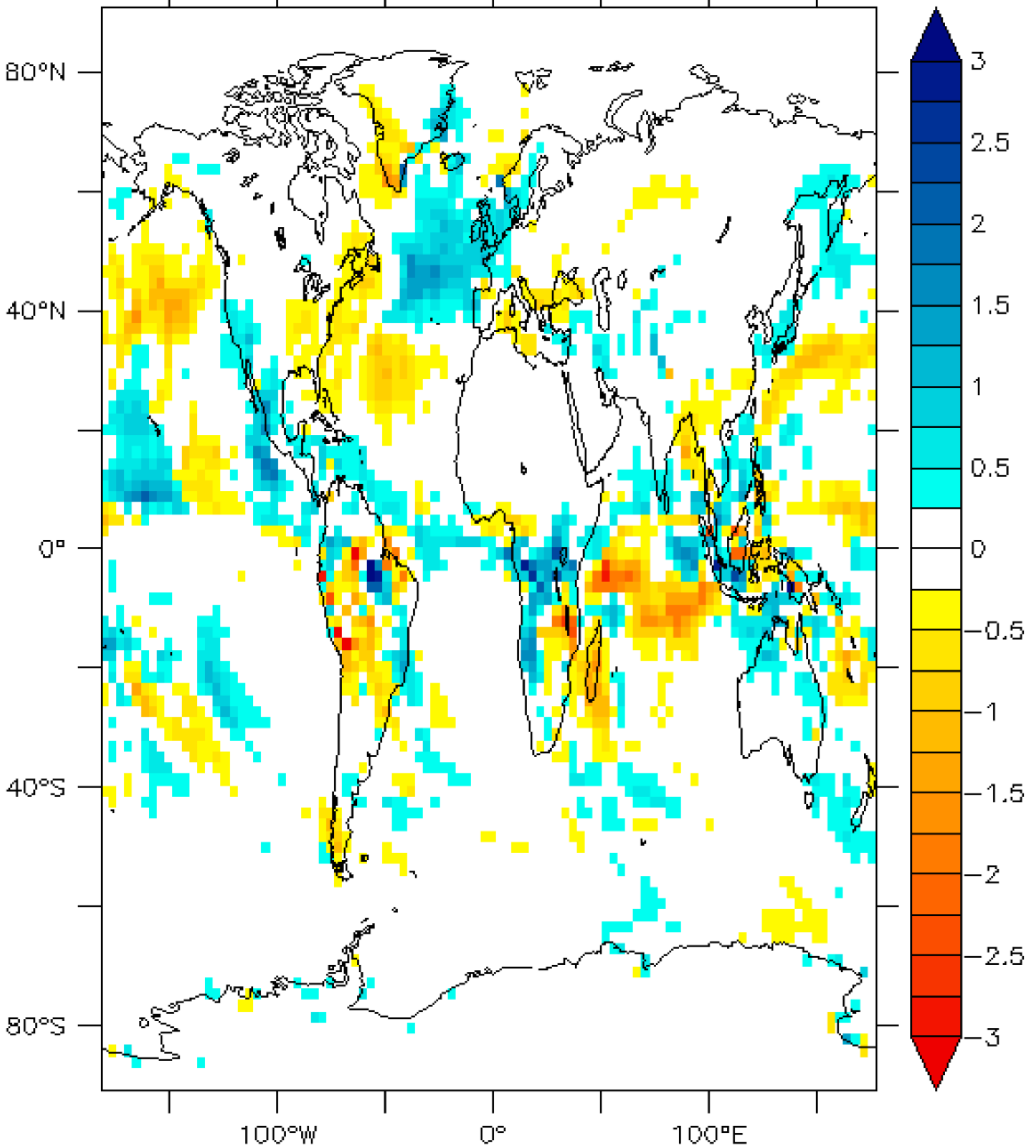


10-year averaged (year 11→20)

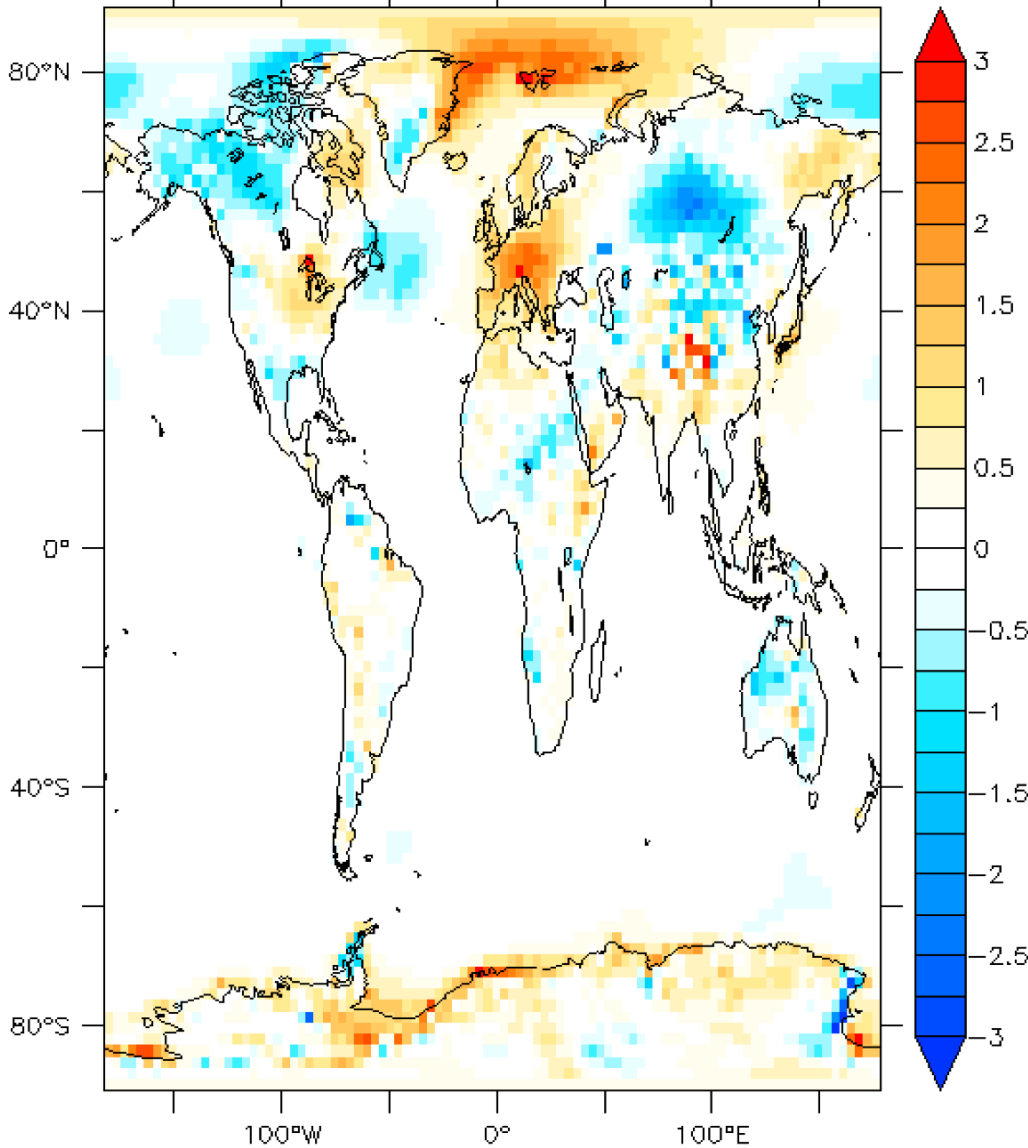
10m wind module etopo2-Relief (%)



10-year averaged (year 11→20)

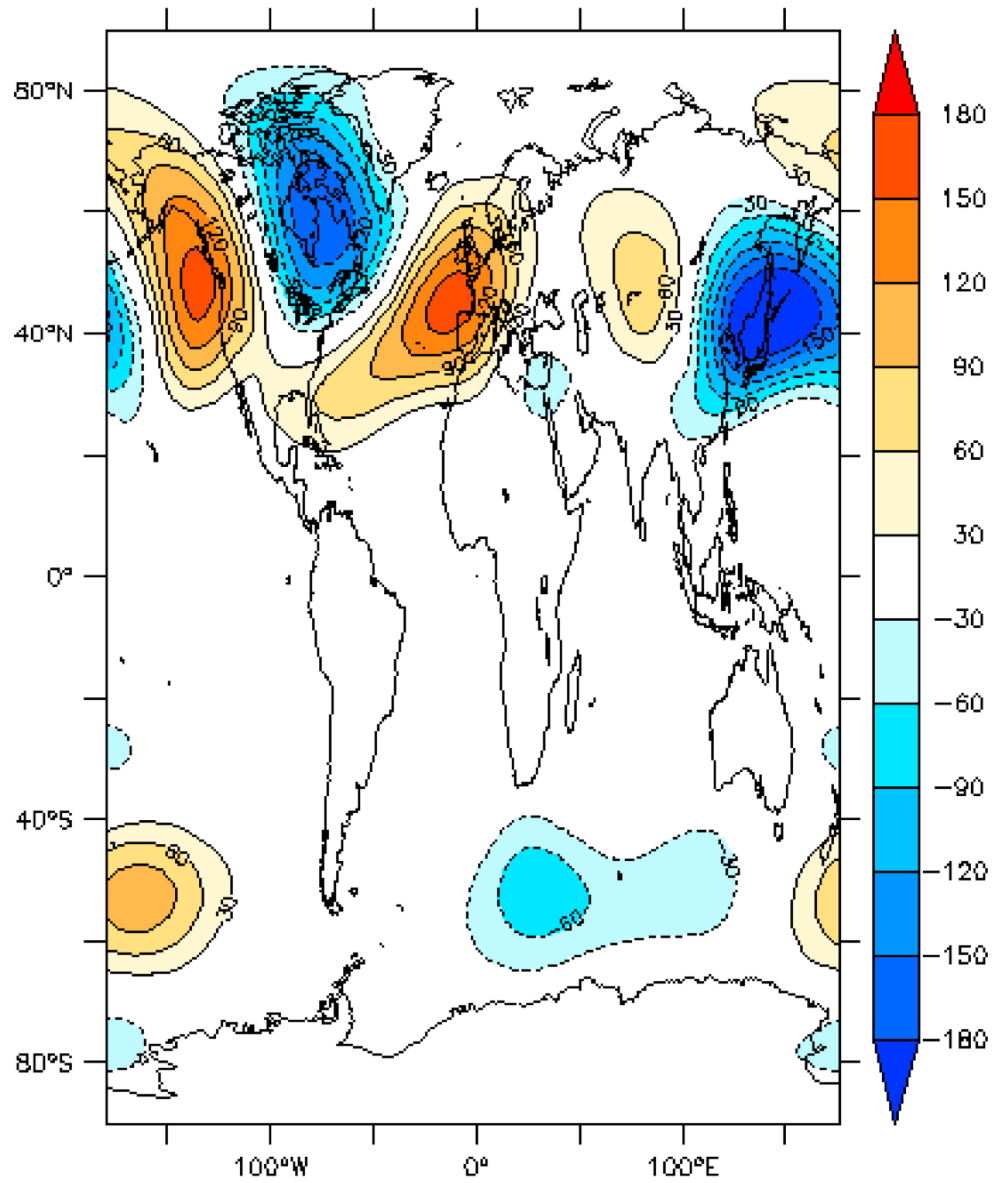


precip (mm/d) etopo2-Relief l=12:14@ave

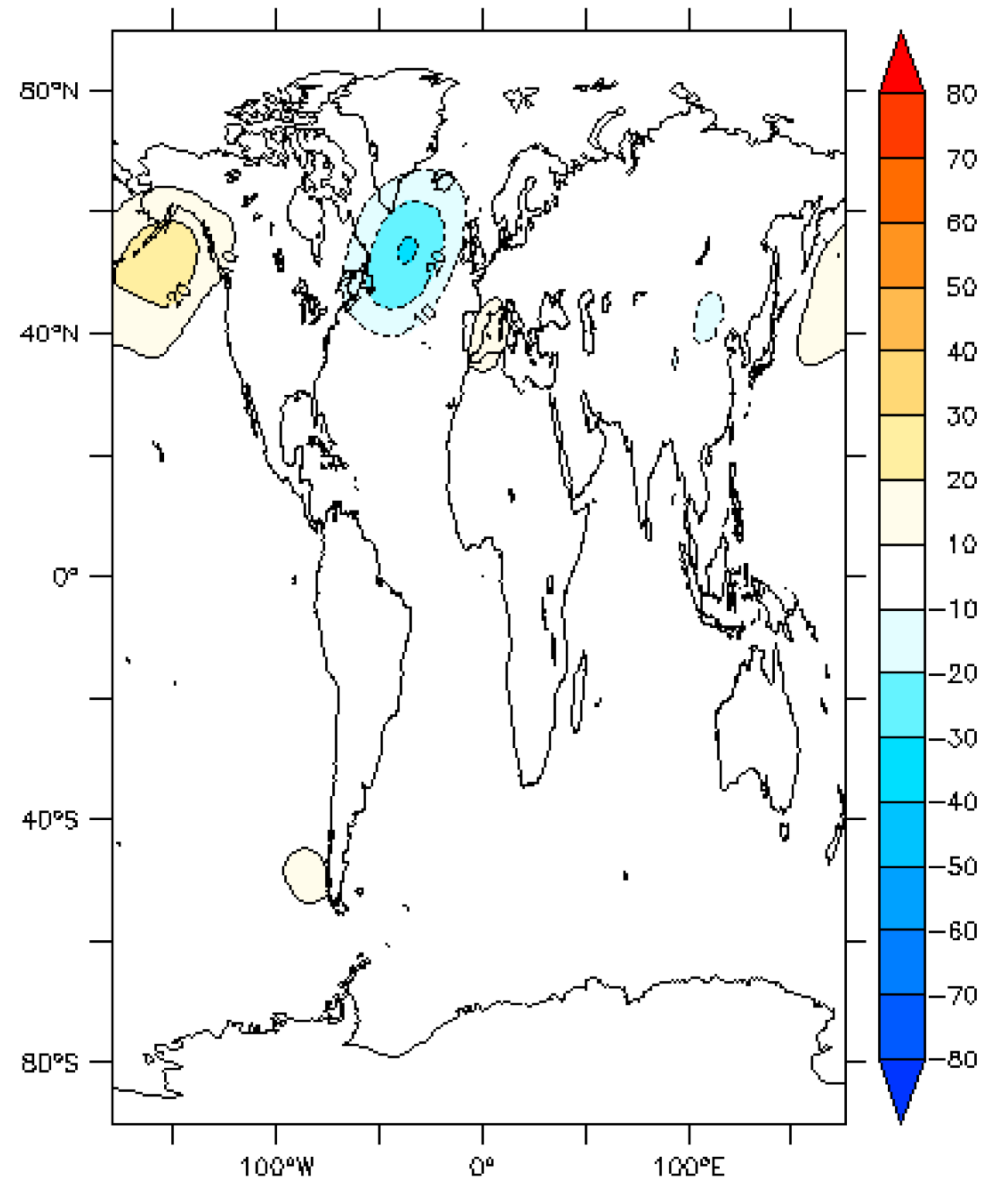


T2M (mm/d) etopo2-Relief l=12:14@ave

50-year averaged

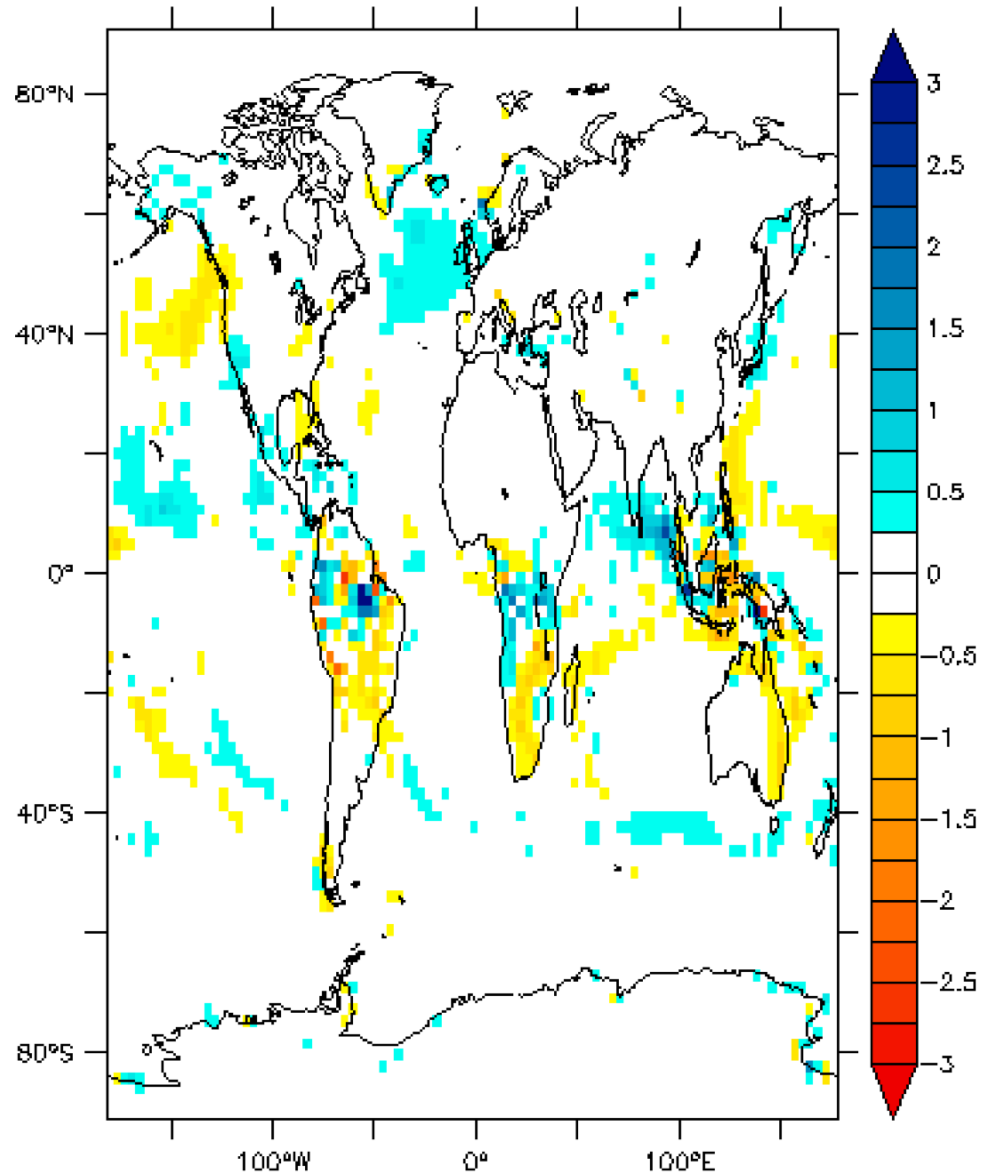


z500-z500[i=@ave] l=12:14@ave

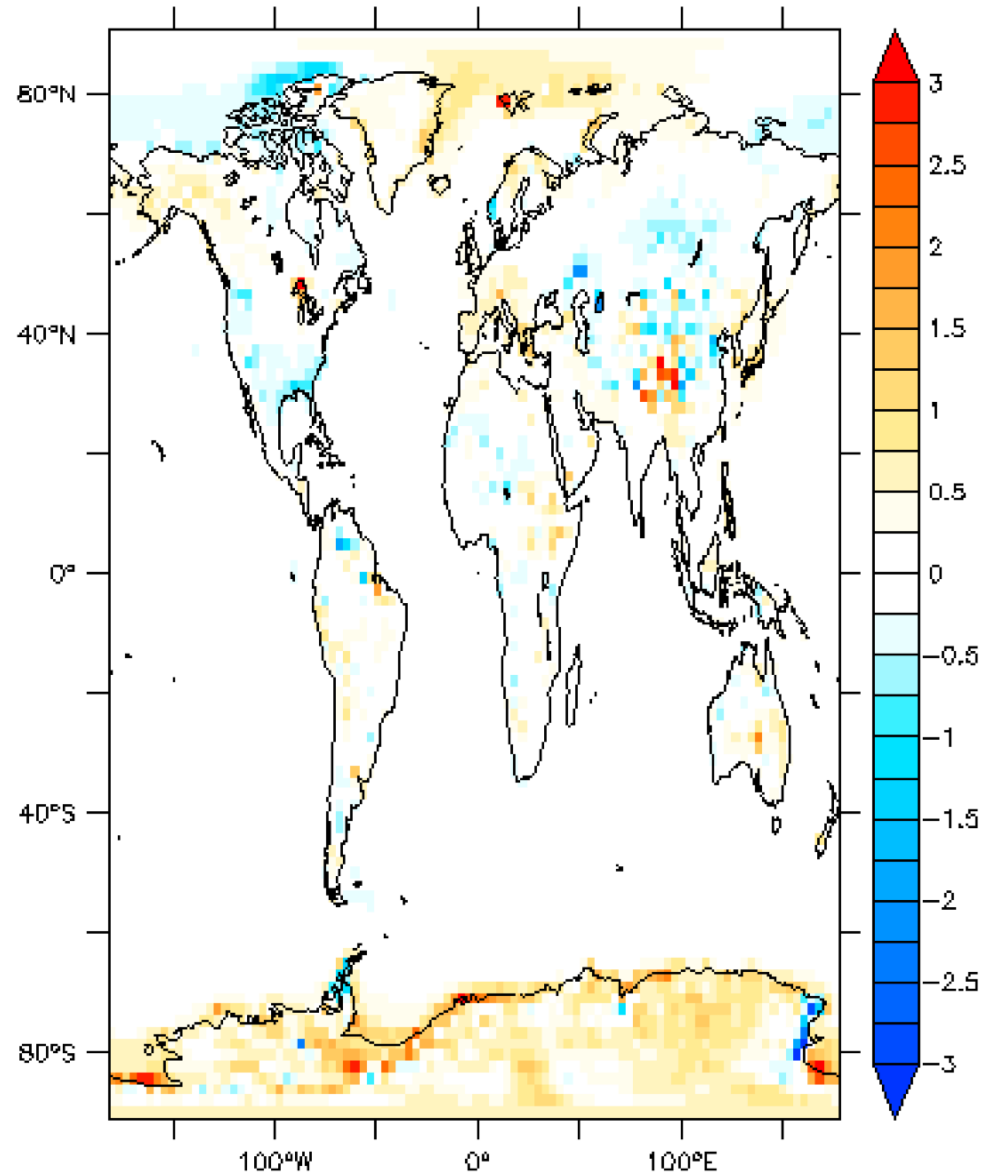


z500 etopo2-Relief l=12:14@ave

50-year averaged



precip (mm/d) etopo2-Relief l=12:14@ave



T2M (mm/d) etopo2-Relief l=12:14@ave

50-year averaged

10m wind module etopo2-Relief (%)

