CORe TOA Radiation Analyses

Zeng-Zhen Hu, Arun Kumar, & Wanqiu Wang

NOAA OLR:
Liebmann B. and C. A. Smith, 1996: Description of a complete (interpolated) outgoing long wave radiation dataset. Bull. Amer. Meteor. Soc., 77, 1275-1277. DOI: 10.1175/1520-0477-77.6.1274.
(http://www.esrl.noaa.gov/psd/data/gridded/OLRinterpolated.pdf).

UMD OLR:
Schreck, C. J., H.-T. Lee and K. Knapp, 2018: HIRS Outgoing Longwave Radiation—Daily Climate Data Record: Application toward Identifying Tropical Subseasonal Variability. Remote Sens. 2018, 10, 1325; https://doi.org/10.3390/rs10091325.
(http://olr.umd.edu/)

CERES EBAF-TOA Ed4.1:
Loeb, N.G., D.R. Doelling, H. Wang, W. Su, C. Nguyen, J.G. Corbett, L. Liang, C. Mitrescu, F.G. Rose, and S. Kato, 2018: Clouds and the Earth's Radiant Energy System (CERES) Energy Balanced and Filled (EBAF) Top-of-Atmosphere (TOA) Edition-4.0 Data Product. J. Climate, 31 (2), 895-918. doi: 10.1175/JCLI-D-17-0208.1.
(https://ceres-tool.larc.nasa.gov/ord-tool/srbavg)

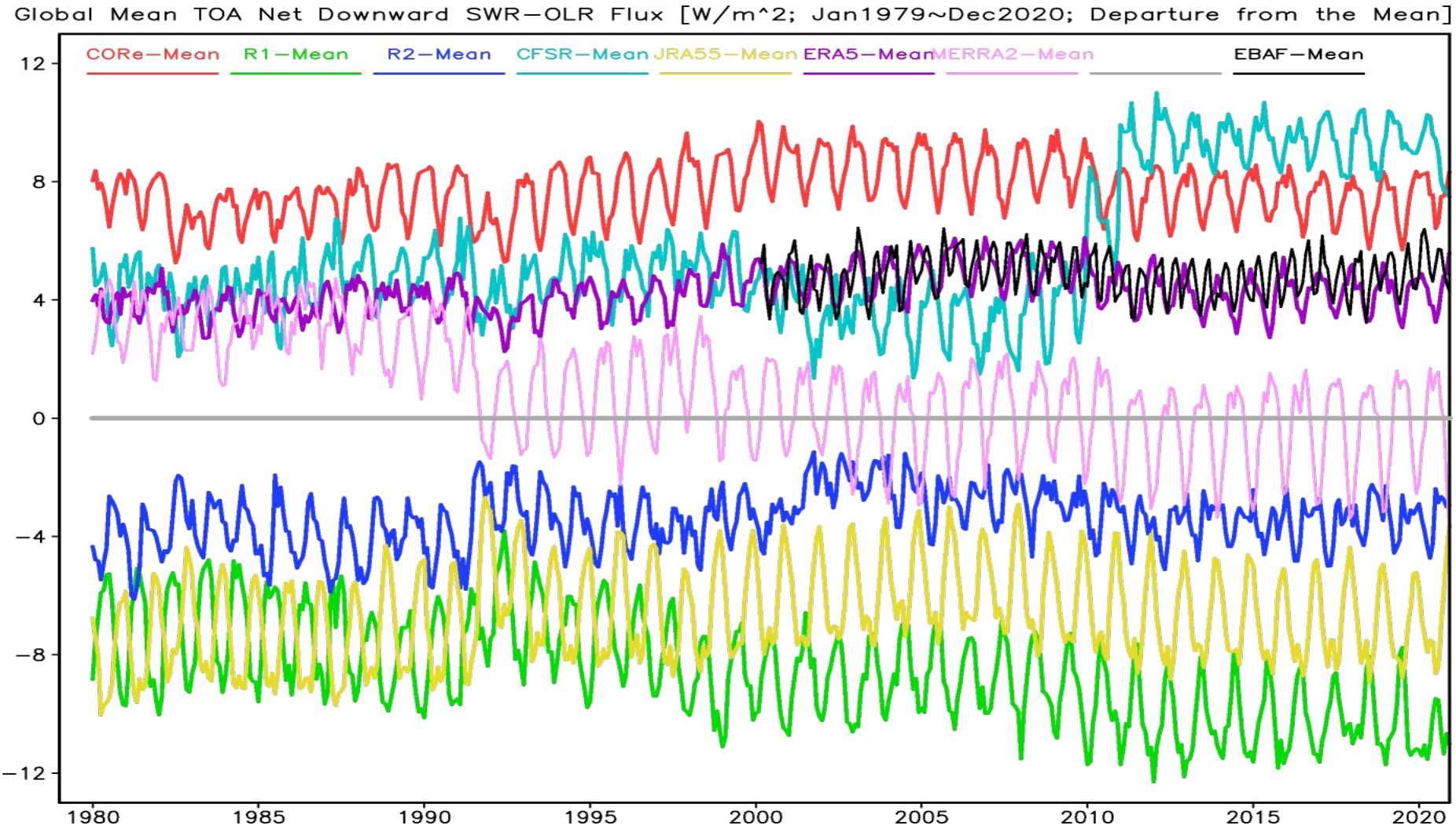
Net Downward SWR-OLR-7ranalysisMean: Global Averaged Time Series

1: CORe is the largest one in most times; R1 is the smallest one

2: Discontinuity in CFSR around 2010-2015 (hindcast to real-time?)

3: no steady linear trend in CORe

4: ERA5 is the closest one to EBAF

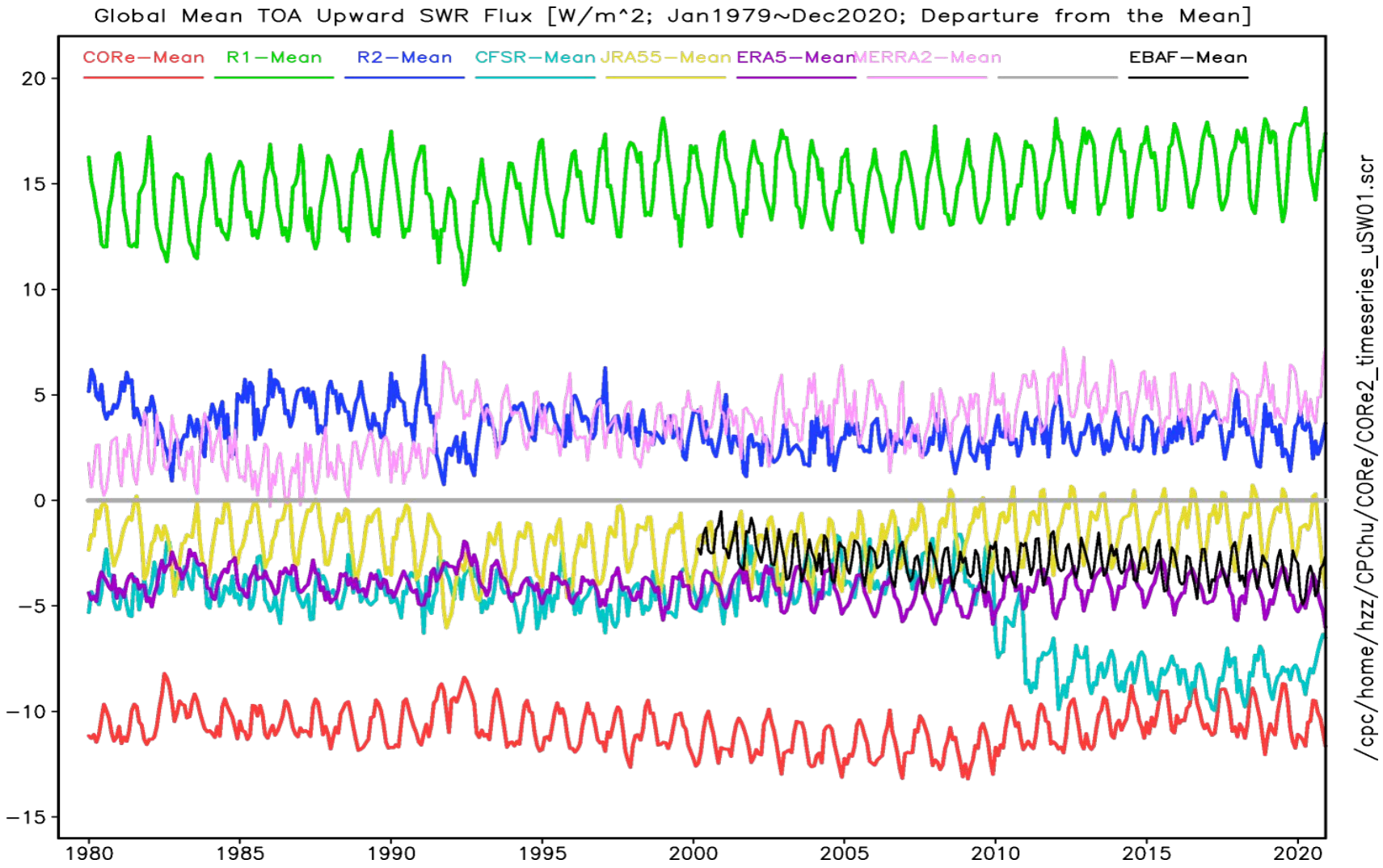


Upward SWR-7reanalysisMean: Global Averaged Time Series

1: CORe is the smallest one; R1 is the largest one

2: Discontinuity in CFSR around 2010-2015

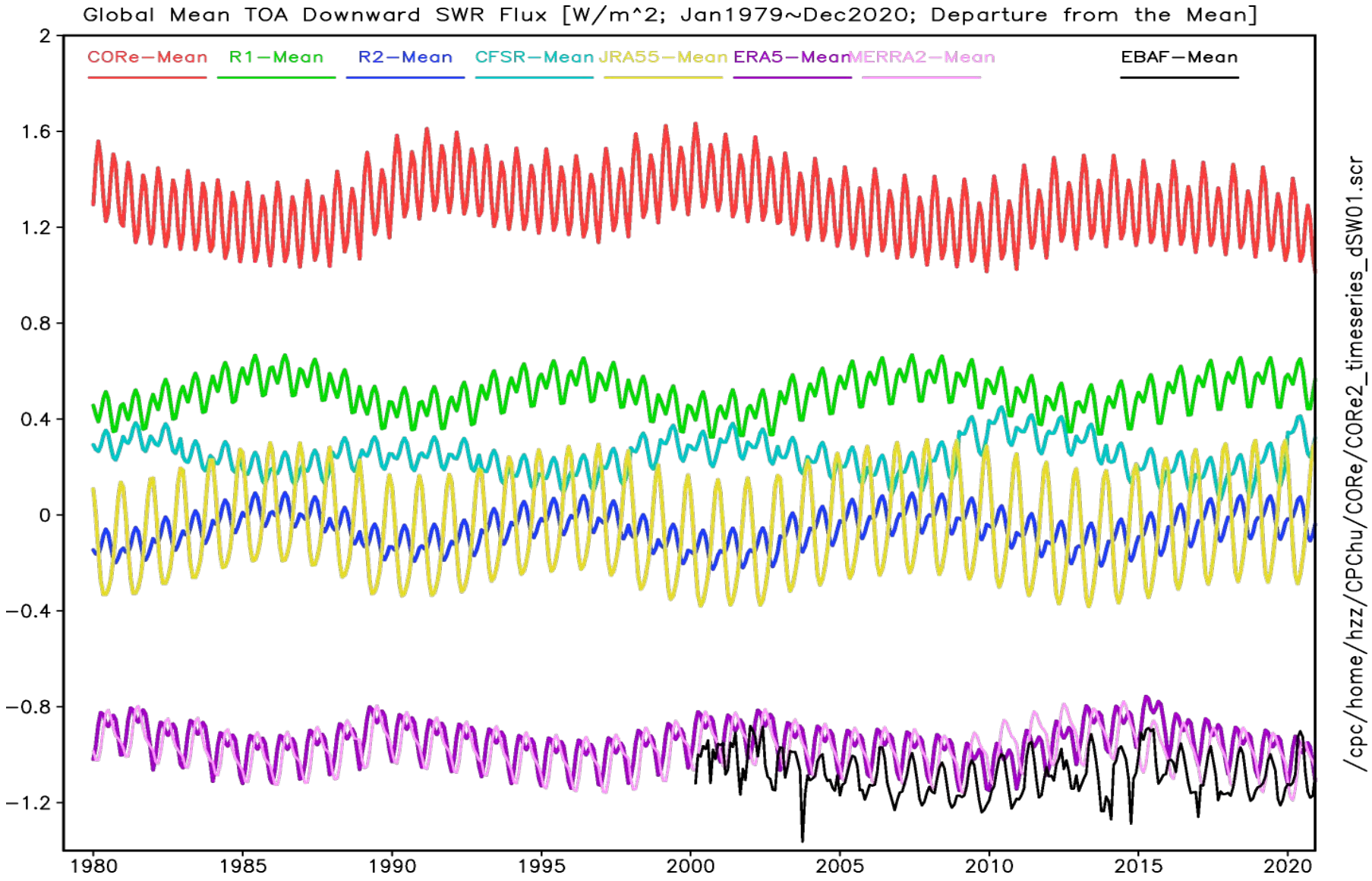
3: ERA5 is the closest one to EBAF



Downward SWR-7reanalysisMean: Global Averaged Time Series

1: CORe is the largest one; EBAF is the smallest one

2: ERA5 & MERRA2 are almost identical and close to EBAF

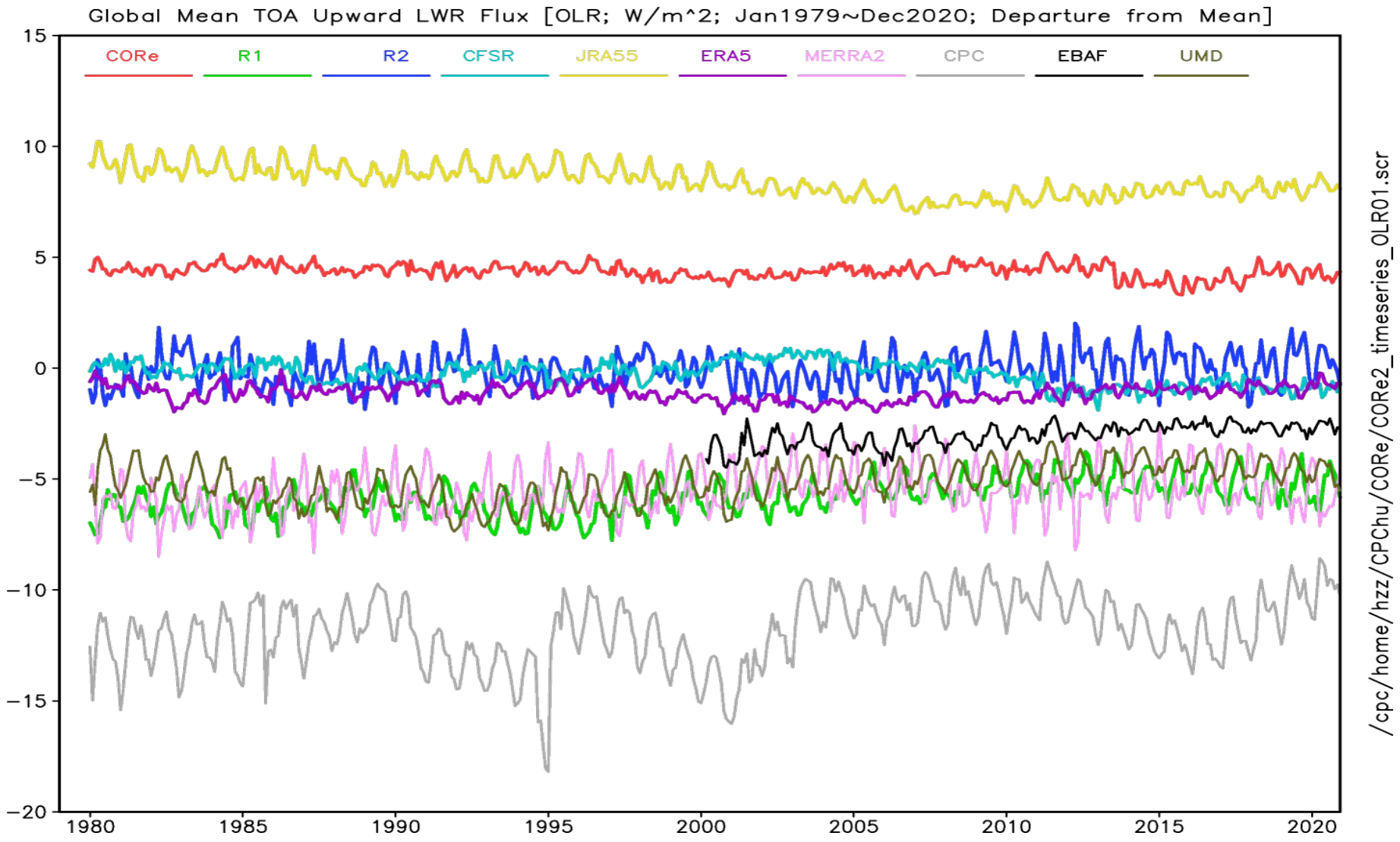


OLR- 7reanalysis mean: Global Averaged Time Series

1: CORe is the 2nd largest one; JRA55 is the largest one

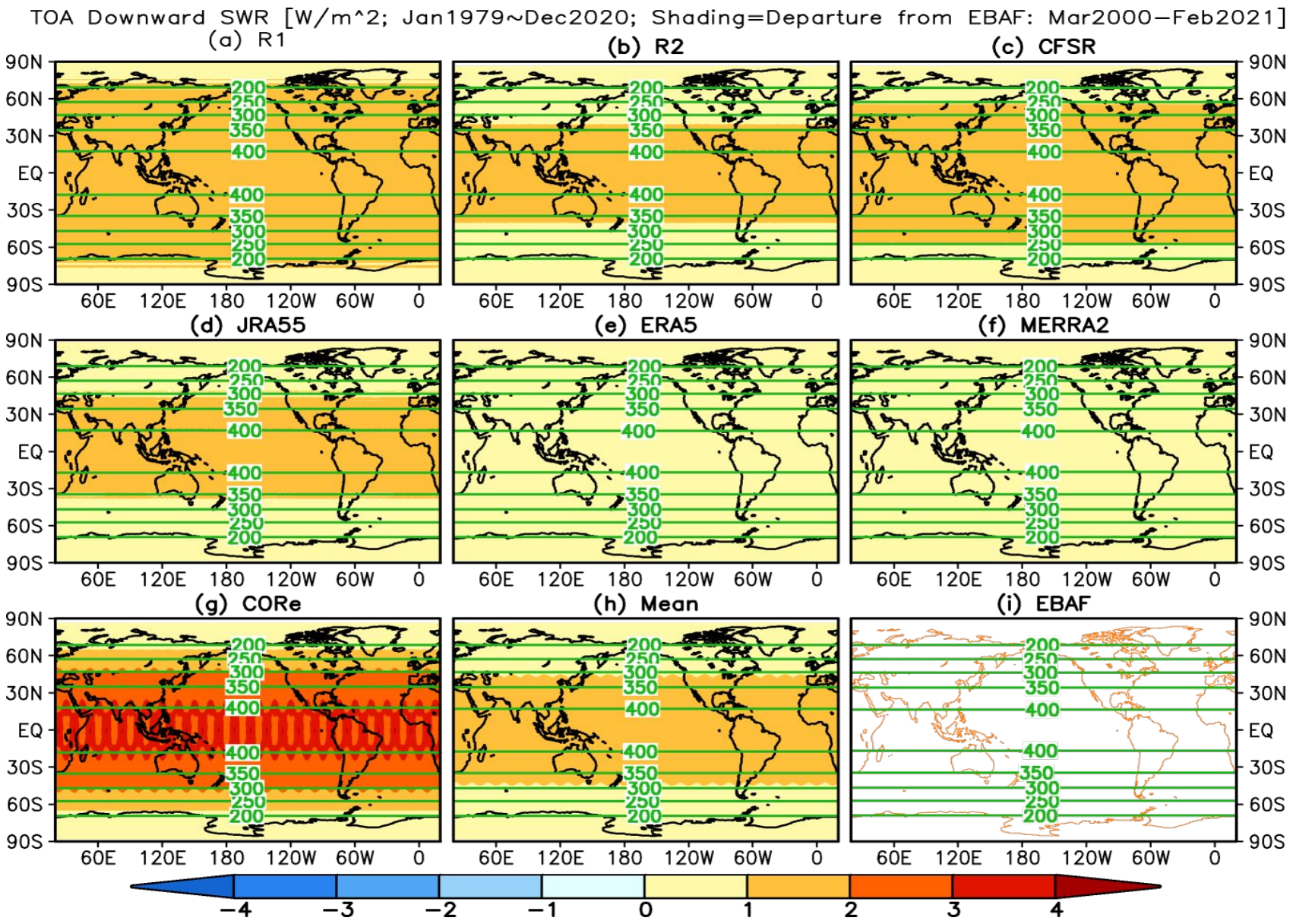
2: R1 & MERRA2 are the closest ones to UMD OLR

3: CPC-UMD OLR= -5~-10 W/m^2?



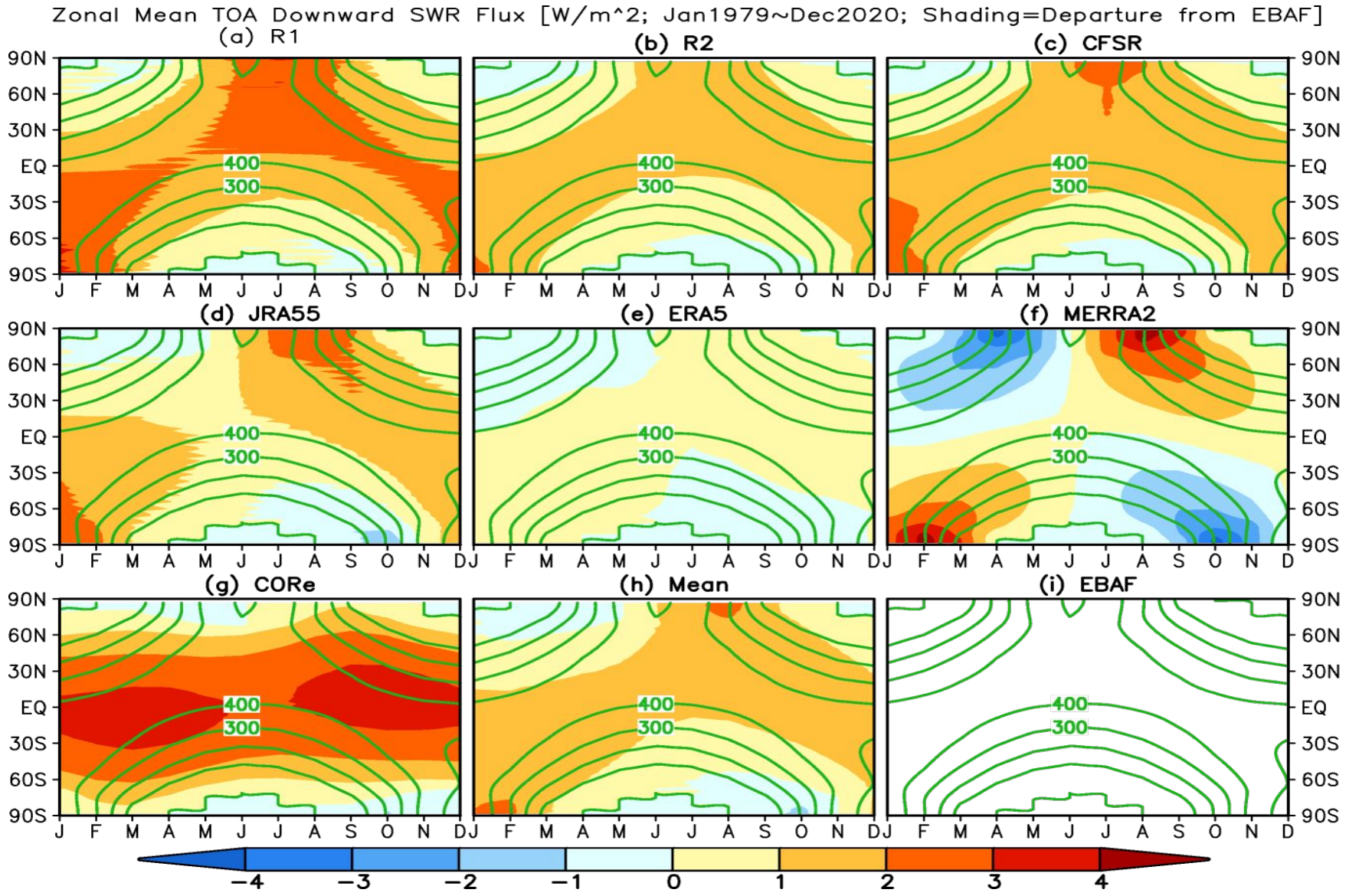
Downward SWR: Climatology (contour) & departure from EBAF (shading)

CORe is the largest one; ERA5 & MERRA2 are the smallest ones



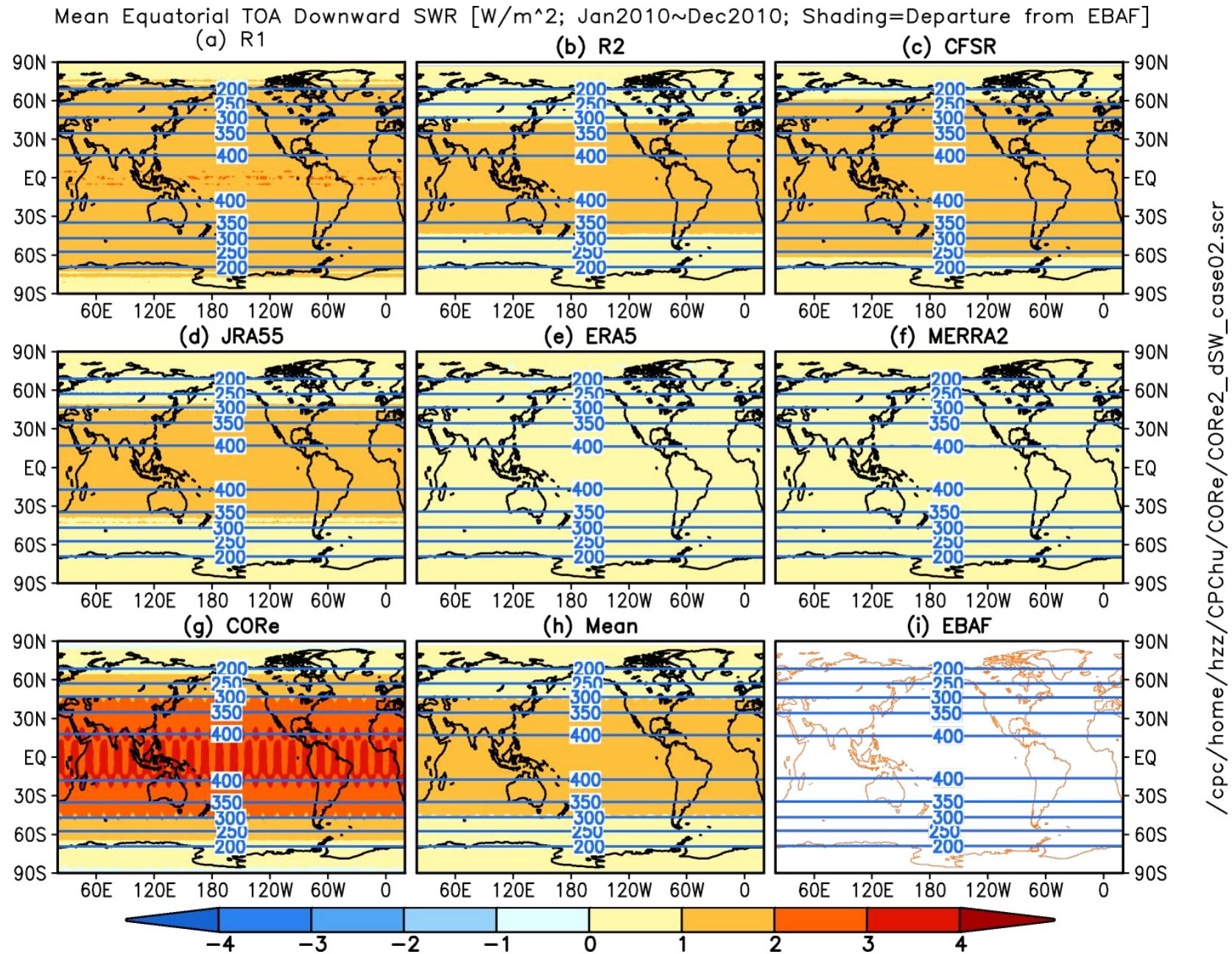
Downward SWR: Zonal Mean-EBAF

CORe is the largest one; ERA5 is the smallest one



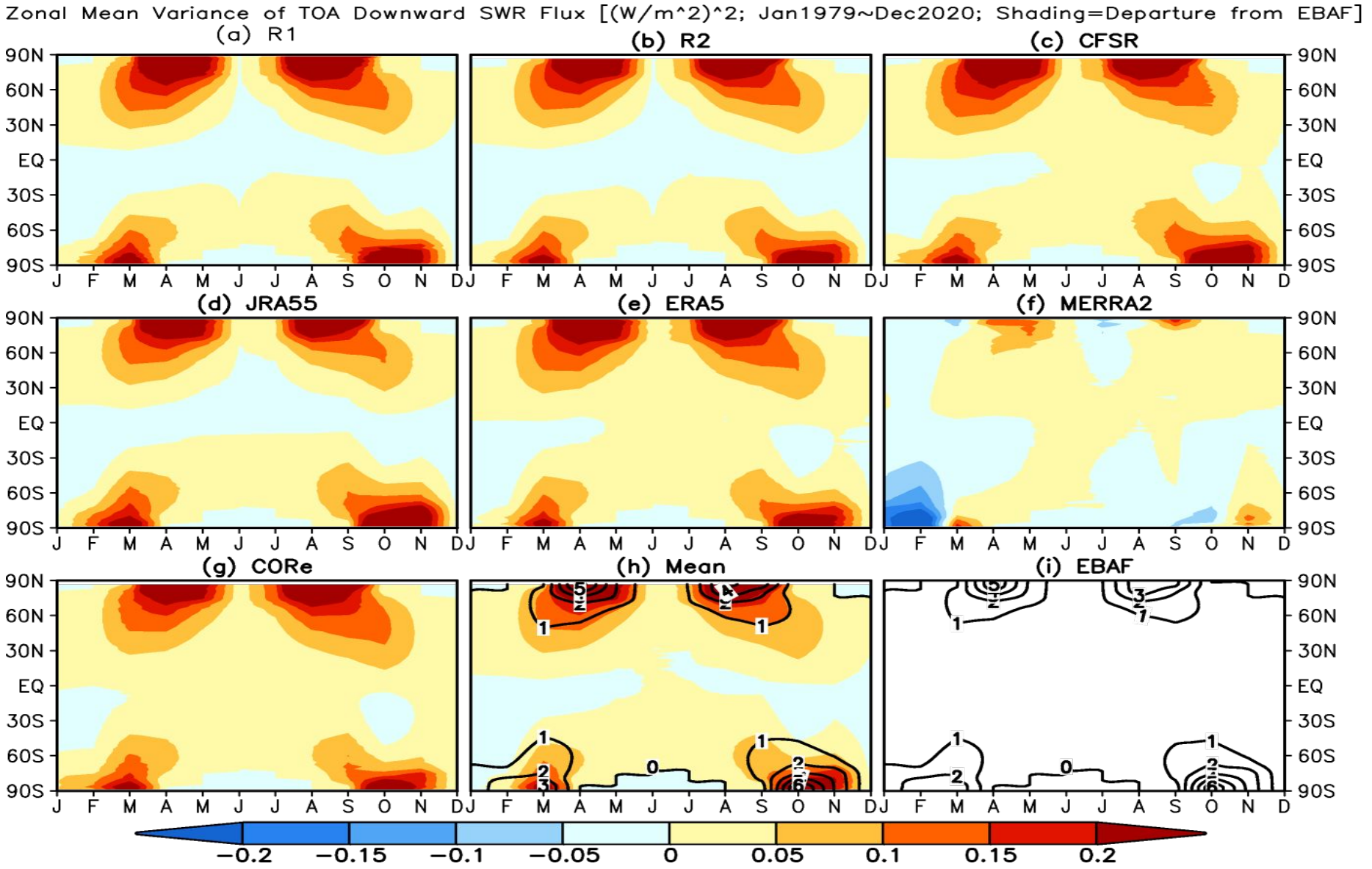
/cpc/home/hzz/CPChu/CORe/CORe2_dSW_season01.scr

Jan-Dec 2010 Mean Downward SWR (contour) & departure from EBAF (shading)

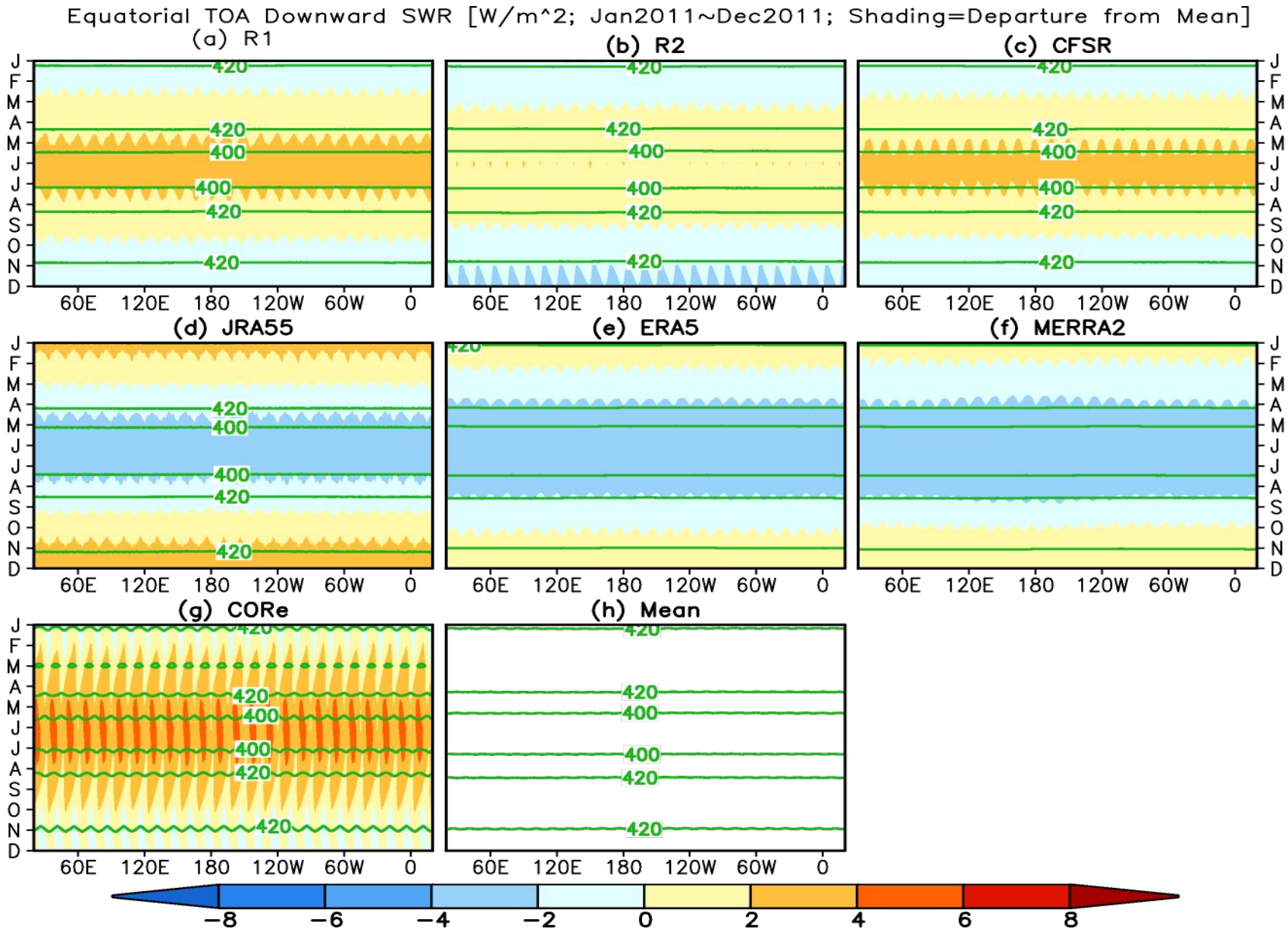


Downward SWR: Zonal Mean Variance-EBAF

MERRA2 is the smallest one & all others are larger than EBAF



Equatorial Downward SWR: Jan-Dec 2011 (contour) & departure from mean (shading)



/cpc/home/hzz/CPChu/CORe/CORe2_dSW_case01.scr

Summary

- "Net Downward SWR-OLR" is the largest in CORe, mainly due to smaller upward SWR (also to larger downward SWR);
- Discontinuity of "Net Downward SWR-OLR" in CFSR around 2010-2015 is mainly due to upward SWR;
- There is no obvious trend in CORe;
- Variability is the smallest in MERRA2.
- CPC-UMD OLR= -5~-10 W/^2?