October 12-16, 2015, Université Pierre et Marie Curie (UPMC), Paris, France

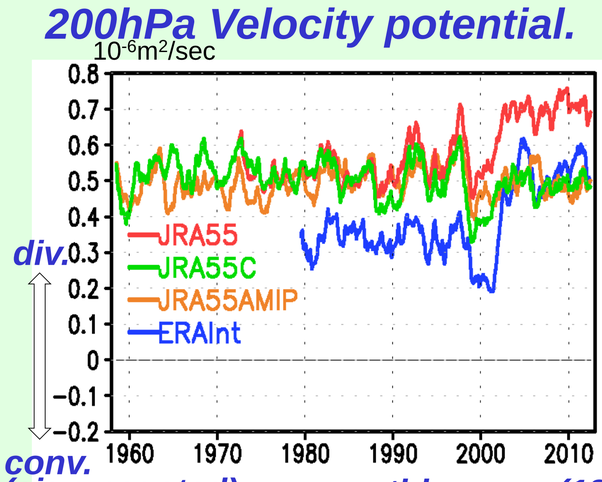
SPARC - Reanalysis Intercomparison Project (S-RIP) Workshops and SPARC Data Assimilation (DA)

Comparison of the tropospheric circulations among the JRA-55 family members

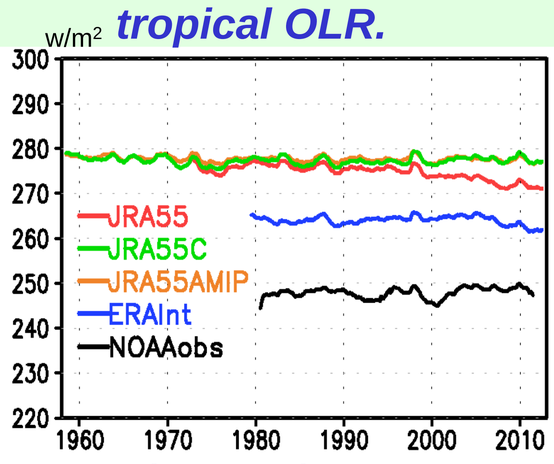
Chiaki KOBAYASHI, MRI (Meteorological Research Institute) of JMA

e-mail: ckobayas@mri-jma.go.jp

Zonally averaged tropical 200hPa Velocity potential.



Zonally averaged tropical OLR.



monthly mean (13mon-running mean)
20N-20S average

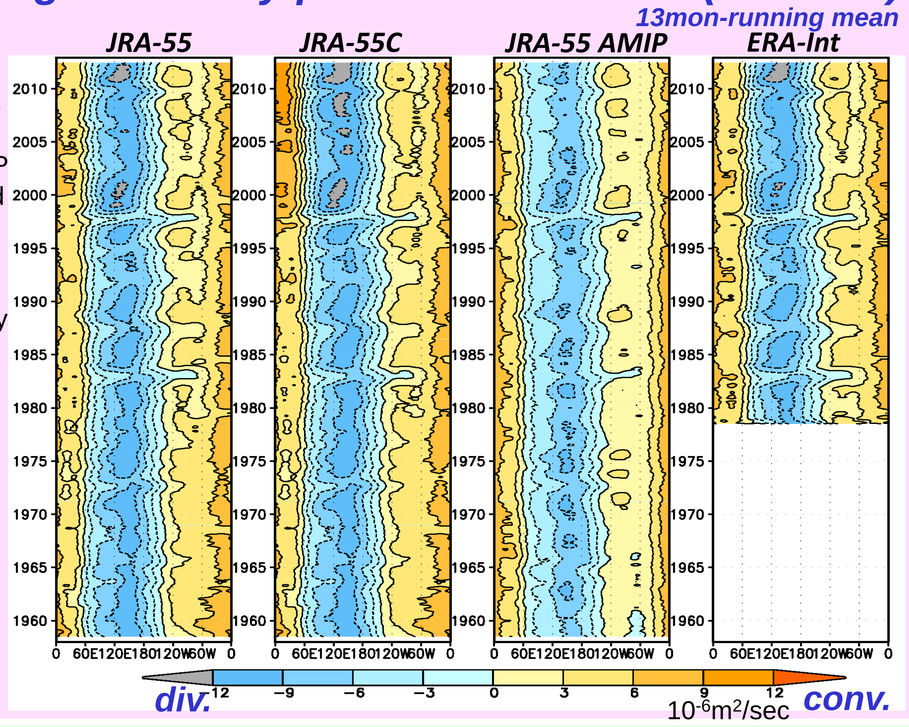
Does the change at the end of 1990's in JRA-55 indicate intensification of Hadley circulation or artificial change caused by assimilated observation change ?

Summary

- In order to evaluate the intensity of the Hadley circulations during reanalysis period, zonally averaged tropical divergence in the upper troposphere was evaluated using JRA-55 family members.
- The zonally averaged tropical divergence during 2002-2012 is 1.4 time lager than that during 1958-1998 in JRA-55, although the intensification is not found in JRA-55C and JRA-55AMIP.
- Zonally averaged tropical OLR shows intensification of convective activity in JRA-55. But the observed OLR do not indicate the intensification.
- Zonally averaged tropical convective activity in JRA-55C indicate reasonable change over time with observation, but questionable behavior, abrupt change at the end of 1990's, has seen over Africa.
- The cause of the abrupt change in JRA-55C is unknown so far.
- Trends estimation of the Hadley circulations using reanalysis products should examine closely.

Time-longitude cross section of Tropical averaged velocity potential at 200hPa (20S-20N)

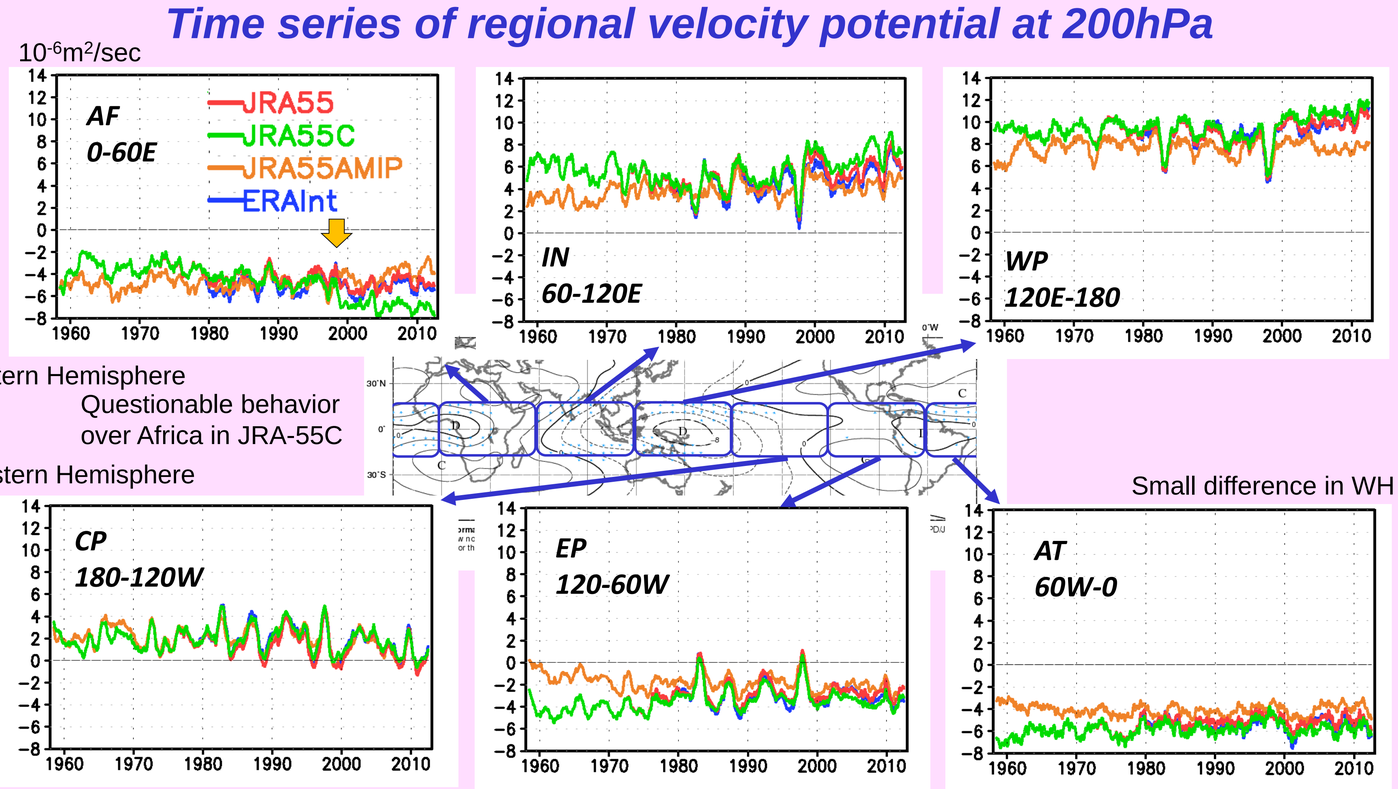
13mon-running mean



JRA-55&55C Div. intensify over IO & WP since the end of 1990's.

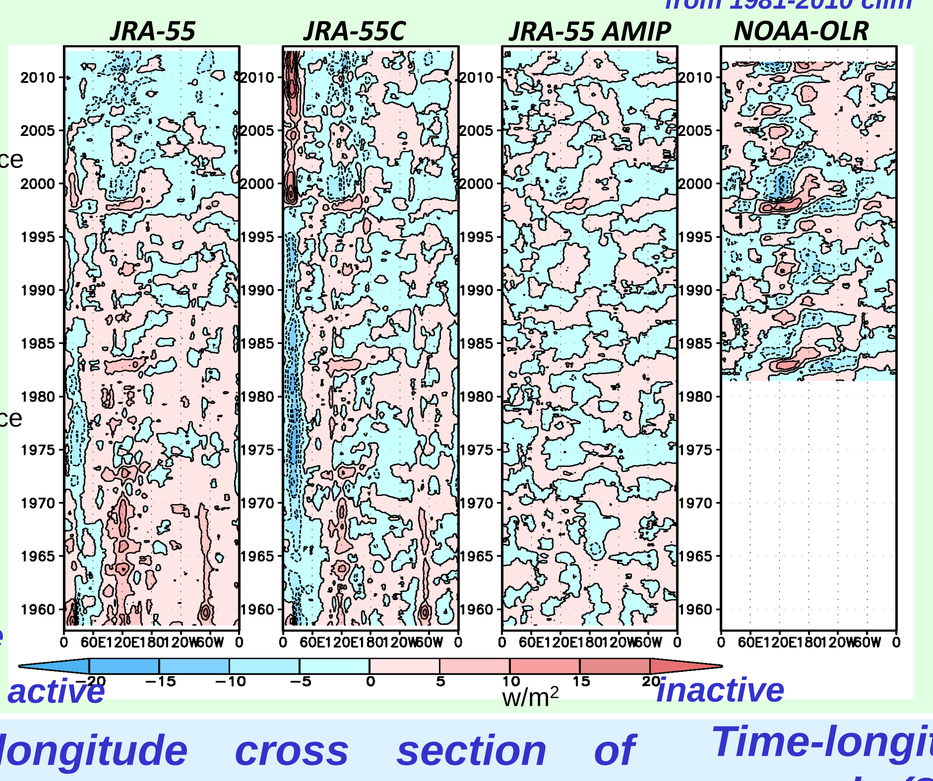
JRA-55C Conv intensify over Africa since the end of 1990's.

Time series of regional velocity potential at 200hPa



Time-longitude cross section of OLR anomaly (20S-20N)

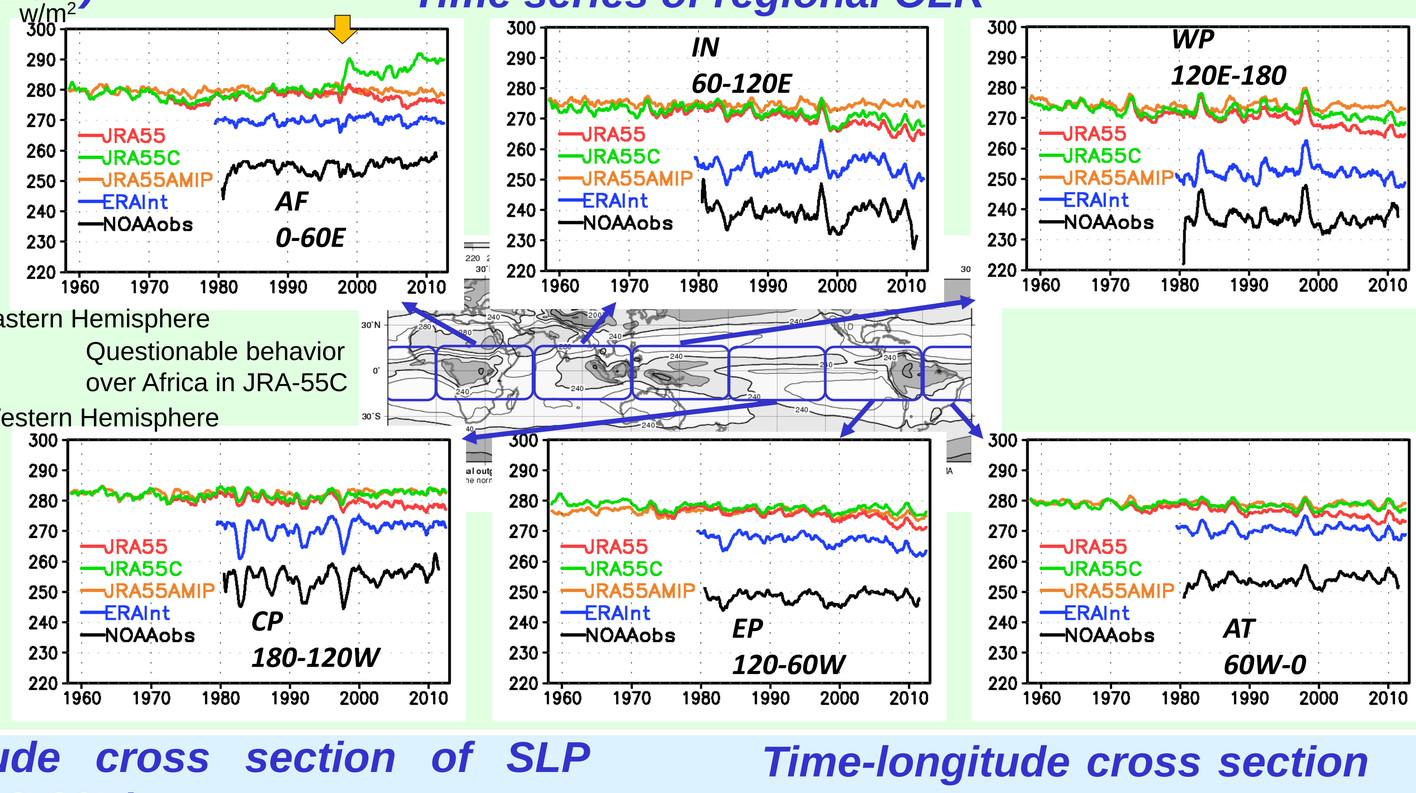
from 1981-2010 clim



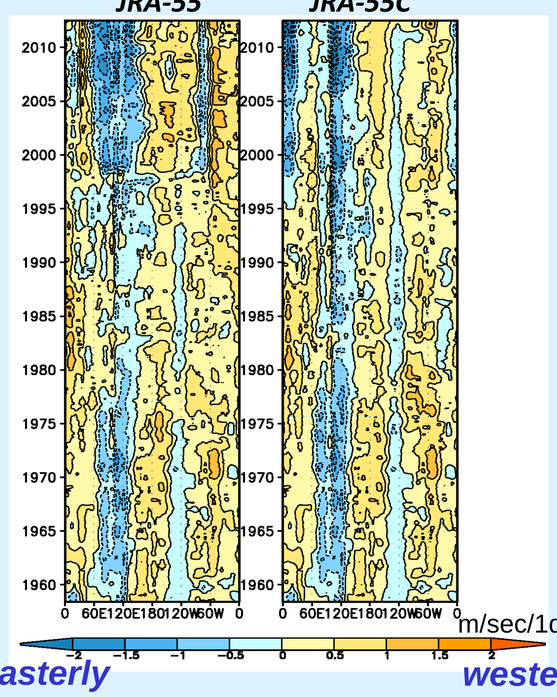
JRA-55 Convective activity intensify since the end of 1990's.

JRA-55C Convective activity intensify since the end of 1990's.

Time series of regional OLR



Time-longitude cross section of 200hPa U-wind increment (10S-10N)

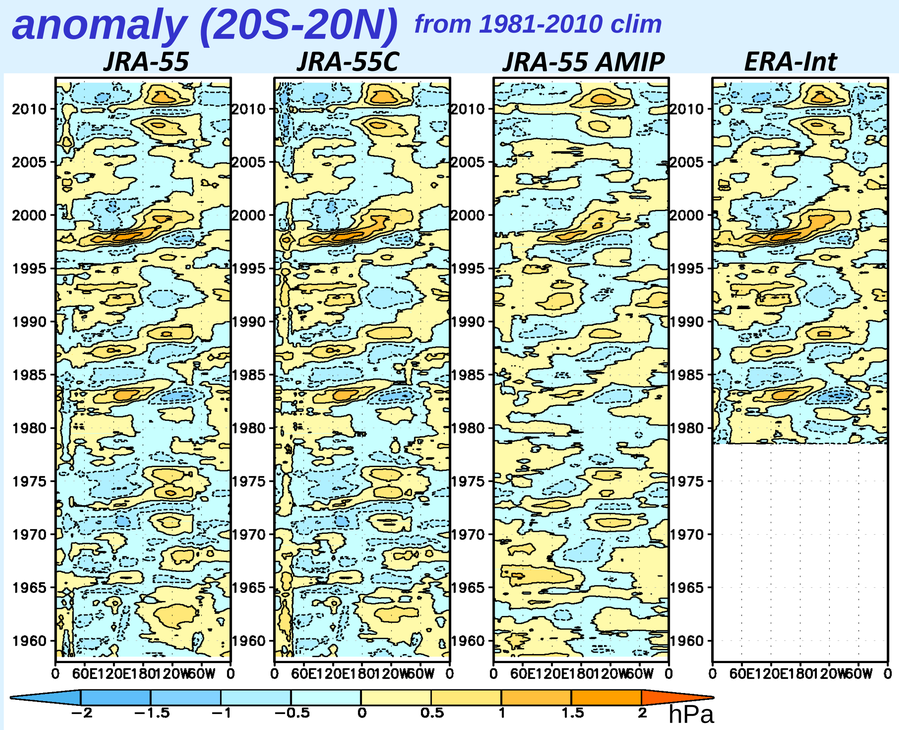


JRA-55 changed over globe since the end of 1990's.

JRA-55C changed over Africa since the end of 1990's.

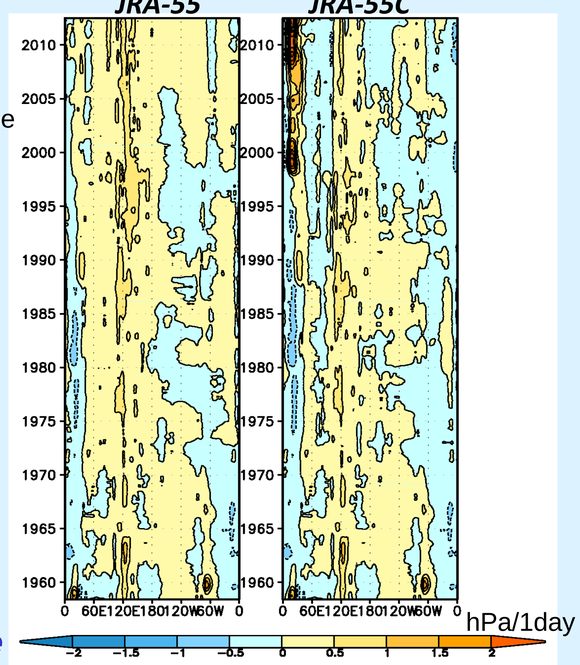
Time-longitude cross section of SLP anomaly (20S-20N)

from 1981-2010 clim



JRA-55C: negative anomalies over Africa after 2005.

Time-longitude cross section of SLP increment (10S-10N)



JRA-55C changed over Africa since the end of 1990's.

JRA-55C: positive increment over Africa after 2005.

?