Impact of Sudden Stratospheric Warming Event on the TTL and Deep Convective Activity

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ACP, 2015
Kodera et al. (2015, ACP)

Cloud frequency

Normalized $\omega'$

Precipitation
Correlation coefficient

COV

- OLR

\( \omega \)

Pressure

\( \delta T/\delta z \)

Pressure

2009

2010

<25S-25N>
SSW event in a non-hydro model

Eguchi et al. (2015, ACP)

14-20 Jan mean

Diabatic heating

Water vapor
Model SSW impact: Longitudinal structure

before onset  
7-13 Jan

Diabatic heating rate at 14.3 km

after onset  
14-20 Jan
Observed SSWs

OLR and Velocity potential at 925 hPa

Convective active zone expands over a wide longitudinal areas in the SH 10-20S
2010 SSW case:

\[ <25S-12.5S> \]

\( \omega'/sd \)

a) 20-26 Jan

COV

b) (i) 23-25 Jan

(\( <12.5S-25S> \))

(ii) 26-28 Jan

TC

Pressure

Longitude
MODIS Cloud top pressure

23-25 Jan 2010

TC Olga: 22 – 30 Jan

26- 28 Jan

TC Nisha: 27 – 31 Jan

Flood

TS11: 26– 30 Jan

TC

60E  120E  180  120W  60W

15N  10N  5N  0  5S  10S  15S  20S

130  157  184  211  238  265  292  319  346  373  400
MRI Chemical transport model simulation (JRA55 horizontal winds)

ω 100

CO 100
The NIPR trajectory model study using ECMWF interim winds

The NIPR trajectory model study (Tomikawa and Sato, 2005; http://firp-nitram.nipr.ac.jp) was used.
Concluding remark:

We need to study local and global vertical velocity variation together.

SPARC: D. Pendlebury