



Combined impact of El nino and Indian Ocean Dipole on the Australian summer monsoon

N. Vyazilova

Russian Research Institute of Hydrometeorological Information - World Data Center

6, Korolyov St., Obninsk, Kaluga region, 249035, Russia

(e – mail: nav@meteo.ru)

It is known that eastern Australia has a very robust ENSO signal in the October – November –December (OND) season. On the other hand, OND season is period of most strong anomalies for Indian Ocean Dipole events. The influence of El Nino for Australian summer monsoon often had showed as hot and dry conditions in the first part of the season.

The influences of the ENSO and Indian Ocean Dipole (IOD) events on the Australian summer monsoon rainfall were studied based on analyse for years: with pure El Nino (2002), with El Nino and positive events of IOD (1997 and 2006), with La Nina (2000). The mean month NCAR/NCEP reanalyses data were used for study.

The anomalies of rainfall, OLR, sea level pressure, surface zonal wind, velocity potential were analysed for austral spring and summer seasons in Indian-Pacific tropical region. The analyses demonstrates that patterns of anomalies in 2000 (with La Nina) were opposite patterns of anomalies in 2002 (with El Nino). Anomalies in 2006 (with El Nino and IOD) were more intensive than in 2002 (with El Nino).

In spring and summer seasons 2002 and 2006 years the results show strong rainfall deficit, surface anticyclonic anomalies in Australia region and strong eastern zonal wind anomalies along South Indonesia, North and East-North Australia. In 2006 strong surface anticyclonic circulation anomalies were observed as over Australia as over South-East Indian ocean and were connected with strong eastern zonal wind anomalies in equatorial Indian (IOD).

During an El Nino event the Walker circulation over tropical Indian-Pacific region is

modulated: a low-level anomalous divergence center over western Pacific and convergence zone over central and eastern Pacific are induced. When strong positive IOD event occurs with El Nino the strong anomalous divergence zone is introduced in the eastern tropical Indian ocean during austral spring season. The analyses of anomalies demonstrates that the positive IOD events reduced the impact of El Nino on the Australian summer rainfall in 1997. The anomalous divergent flow provided the strong west flow of moisture air to North Australia in summer 1997/1998.

In December 2006 unlike December 1997 were observed a strong intensification of east zonal wind anomalies along South Indonesia, North and East-North Australia and strong weakening of west zonal wind anomalies in equatorial central Pacific ocean.