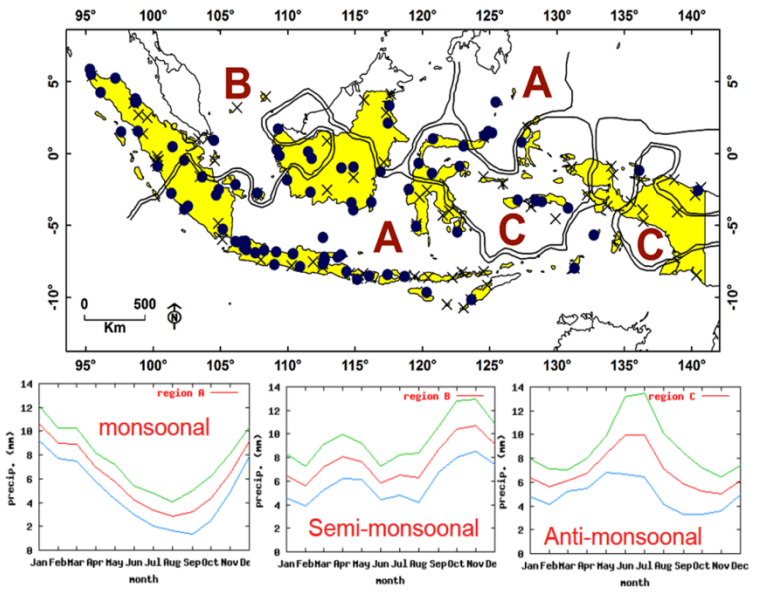
1 Research on Climate Model

- The Maritime Continent [a term coined by Ramage (1968), MC] consists of a multitude of large and small islands and seas off Southeast Asia (Qian,2008)
- Rainfall variability in this region is very complex and is considered as the *chaotic* part of the monsoon variability (*Ferranti* 1997)
- The seasonal to interannual variability of Indonesian rainfall are characterized mainly by the monsoon (*Ramage*, 1971) and the ENSO (*Philander* 1989; *Ropelewski and Halpert* 1987, 1989; *Halpert and Ropelewski* 1992).
- Indonesian climate is strongly affected by the interannual variation of the tropical SST in the Pacific and Indian Oceans associated with ENSO and the Walker circulation (Bjerknes 1969; Zebiak 1982; Cane and Zebiak 1985; Ropelewski and Halpert 1987; Aldrian and Susanto 2003).
- Most atmospheric general circulation models (GCMs) substantially underestimate precipitation over the MC (Neale and Slingo 2003)

Previous studies:

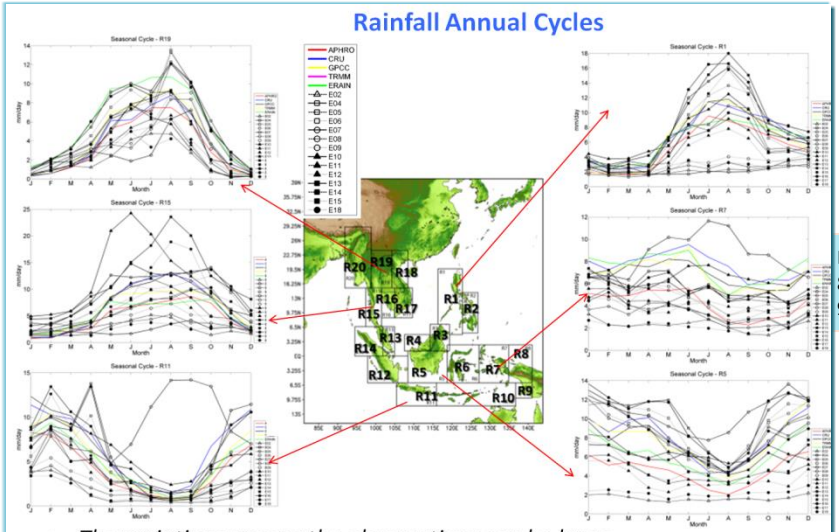
Braak,1921;Wyrtki, 1956; Sukanto, 1969; Ramage, 1971; Philander 1989; Ropelewski and Halpert 1987, 1989; Halpert and Ropelewski 1992; Ferranti 1997;Hackert and Hastenrath, 1986; McBride,1999; Kirono et al., 1999; Haylock &McBride., 2001 and Aldrian, 2003, Qian,J.H, 2008; Qian et.al 2010; Gianotti et.al 2012.

Rainfall Characteristics in Indonesia



(Aldrian & Susanto, 2003; Supari et al., 2016)

Rainfall Annual Cycles



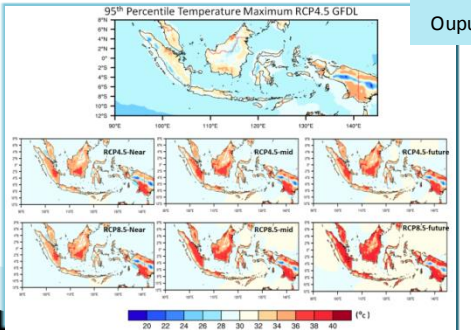
- *The variations among the observations can be large.*
- *Generally, most simulations capture the seasonal cycles but others fail.*

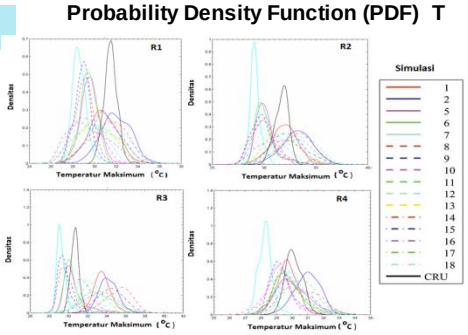
Tangang, CORDEX_SEA

CORDEX-SEA DOMAIN

Domain:
80E-145E and 15S-40N (36 km)
90E-145E and 15S-27N (25 km)

Ouput Model GFDL



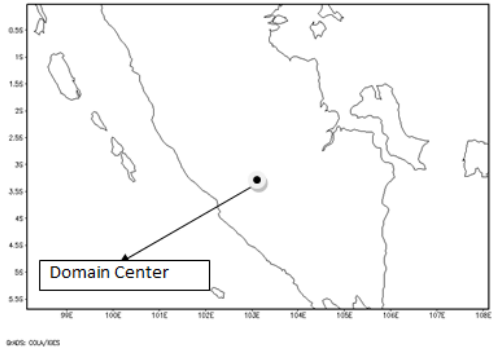


Analysis of Land Use Change Impact on precipitation and temperature in Jambi Province Using RegCM4

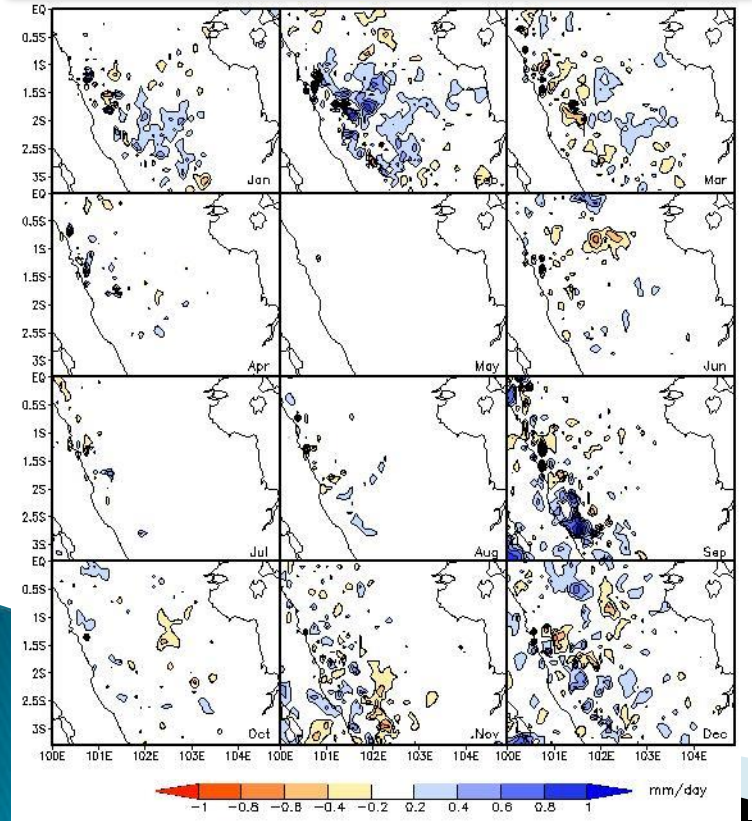
Land use default

change

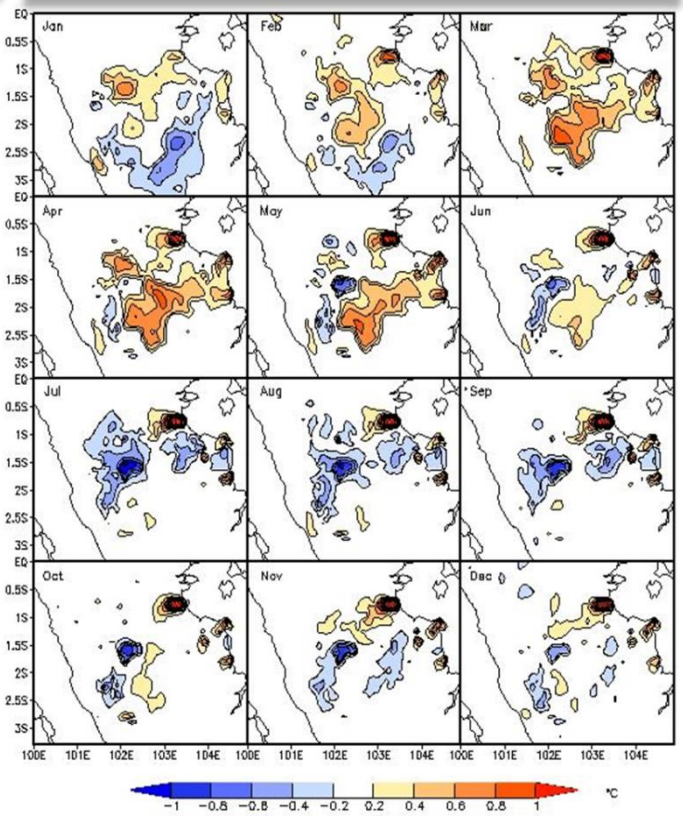
Scenario I	Scenario II
Landuse bakosurtanal 2000	Landuse bakosurtanal 2010



Precipitation Difference: scenario II–scenario I



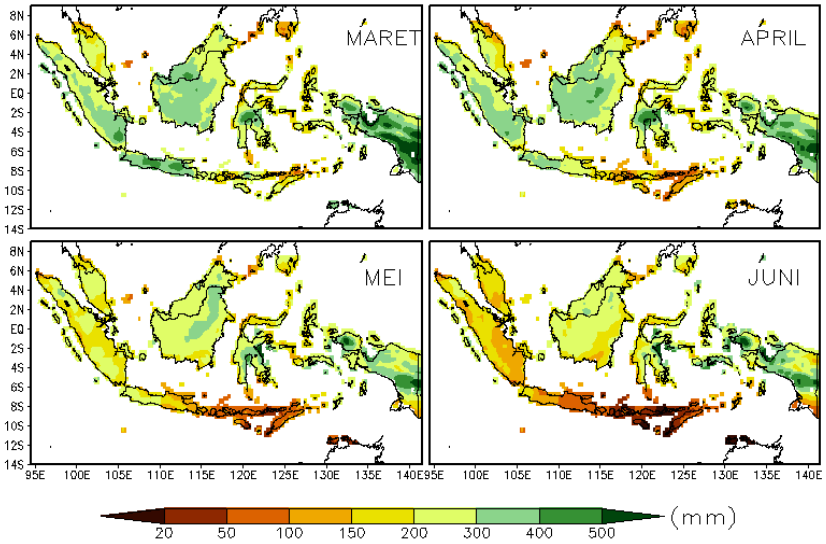
Temperature difference: scenario II–scenario I



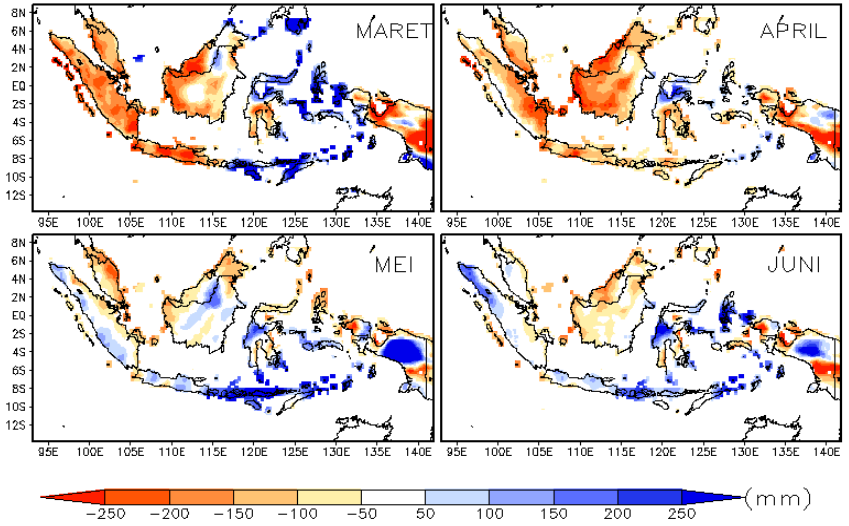
The surface and atmospheric parameters are assumed will change as the land use is changing.

The land use change as captured by the LANDSAT satellite at different time period (year 2000 and 2010) will be used as an input for surface boundary condition required by RegCM4.

Meteorological parameters produced by model simulation will be used for studying the land use change impact to the precipitation and temperature.



Precipitation observed mean spatial pattern TRMM3b43 during 1998-2012 for March-April-Mei-June



Percent bias precipitation between output model WRFv3.5.1 with TRMM3B43 during 1998-2012 for March-April-Mei-June

The WRFv.3.6 model has been successful for monthly and seasonal prediction with NCEP Climate Forecast System (CFS) as input data.

The results show that precipitation over Indonesia during March, April, Mei and June is above normal, except in some areas in Java, Kalimantan, and Papua. Climate prediction using dynamical methods is very possible to be applied for operational purpose in BMKG, but a rigorous study in prediction accuracy is required.

Focus Research:

-impacts of monsoon variability in changing climate to maritime continent Intraseasonal-to-Interannual Variability of the maritime continent

-monsoon prediction in intra-seasonal to seasonal scales.