

Session 3.2

Downscaling over the Asian countries:

1. The Philippines (Matsumoto)
2. Tropical Cyclones in the CORDEX-SEA domain (Gemma)
3. India (Sanjay)
4. Vietnam (Thanh)

Summer Monsoon rainfall over the Philippines



- **Characteristics of summer monsoon rainfall:** seasonal change processes (TRMM & ERA-Interim)
 - Onset of SW monsoon is very abrupt in mid-May
 - Retreats gradually in mid-September & fully retreat in late Oct
- **Effect of spatial resolution on Simulated Rainfall (WRF)**
 - 25 km, 12.5 km, 8 km, 5 km
 - Best: 12.5 km for spatial distribution of climatological rainfall
 - Best: 5 km for inter-annual monthly rainfall
- **Potential impact of SST on rainfall (western Philippines)**
 - positive rainfall sensitivity (increase 100 mm/K) to SST warming

Historical Tropical Cyclones



- Period 1986-2005
- Downscaled ERA-Interim, HadGEM2, MPI, EC-Earth (25km)
- **How well do CORDEX-SEA simulations capture the TC characteristics: pattern, intensity, frequency, lifetime**
 - Pattern: captures spatial pattern but **underestimate the intensity**
 - Simulations **underestimate TC counts**; more fluctuation in models
 - Simulations have a **shorter lifetime** (by about 50%) compared to observed

Land-Atmosphere feedback over India



- CORDEX-SA: 50 km; 6 CMIP5 GCMs
- Study the land-atmosphere feedback via links between soil moisture to lifting condensation level (atmosphere segment) & sensible heat flux (land segment)
- Increased sensitivity in both segments of the feedback pathway over the monsoon trough region
- With increased sensitivity, the summer soil moisture variations could have more impact on regional climate in the future than they do today
- Future plan:
 - Bias correction
 - Global high resolution (27km) runs

Downscaling over Vietnam



- Downscaling results produce **added values** for annual average after a simple bias correction
- Seasonal cycles are not clearly improved with RCMs
- **Strong drift in RCP85 precipitation** needs to be explored
- **Different behaviors of Time of Emergence** in RCMs compared to that in GCMs