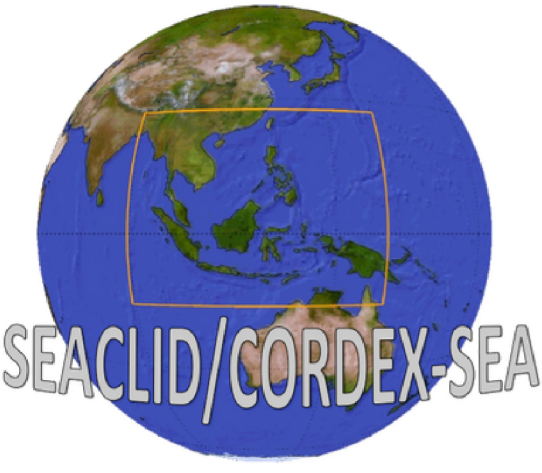




Evaluation of rainfall in high-resolution simulations over Mindanao

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1 Model configuration

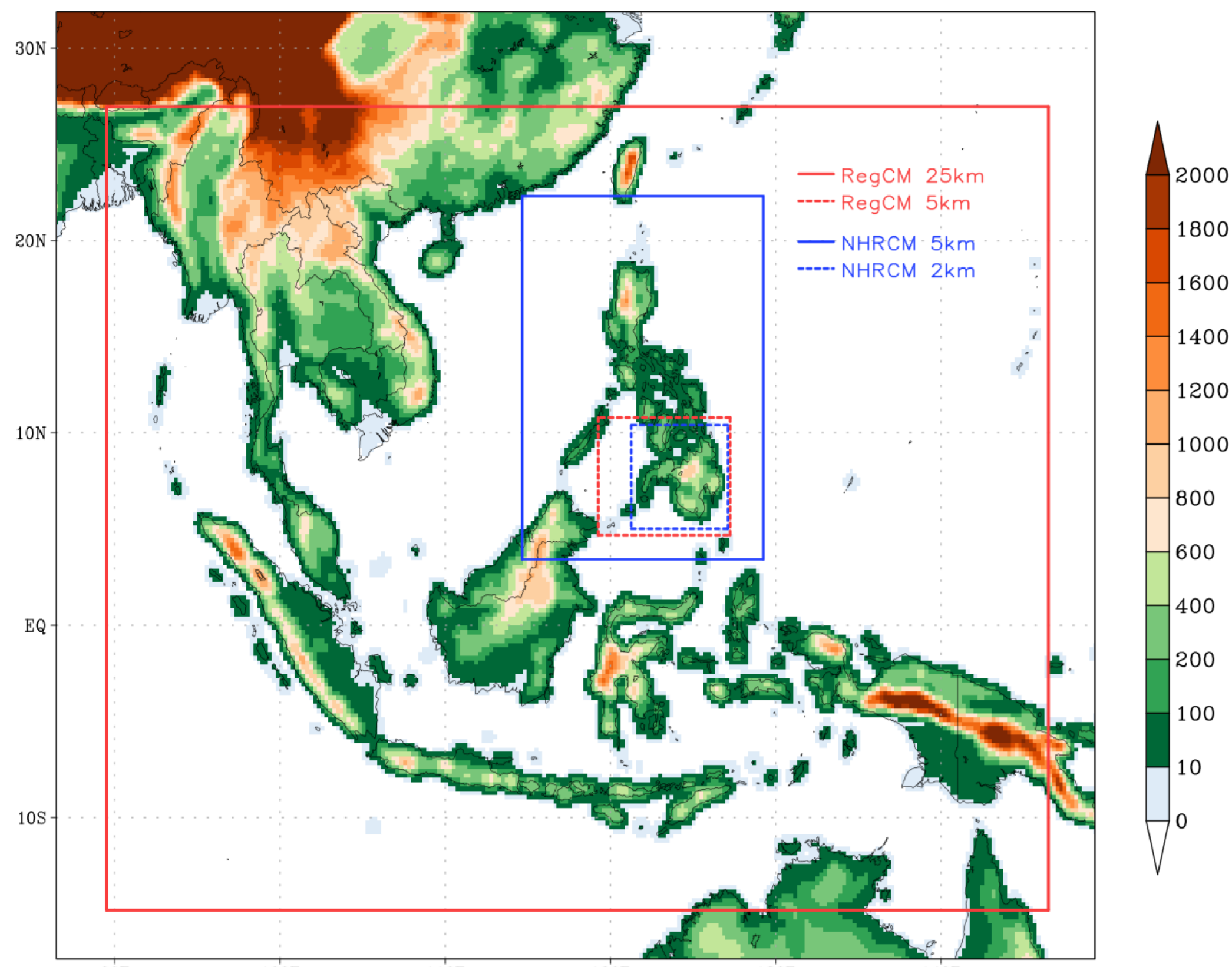


Fig.1 Map of elevation (in meters) of Southeast Asia showing the domains used in RegCM and NHRCM simulations

Details of Regional Climate Models (RCMs) used

RegCM 4.7 [1]	NHRCM [2]
Physics: PBL: Holtslag Cumulus: Emanuel Simulation Period: 1971-2005	Physics: PBL: Mellor-Yamada-Nakanishi Niino Cumulus: Kain-Fritsch (none at 2 km) Simulation Period: 1981-2000

Design of simulations

RCM	Driving GCMs (CMIP5)	Domains		
		Southeast Asia	Philippines	Mindanao
RegCM 4.7	EC-Earth	EC_25		EC_05
	HadGEM2-ES	HA_25	→	HA_05
	MPI-ESM-MR	MP_25		MP_05
NHRCM	MRI-AGCM3.2		NHRCM05	→ NHRCM02

Analysis Period: 1981-2000

Observation datasets:

- APHRODITE V1101R2 0.25° gridded daily rainfall
- PAGASA station daily rainfall (see locations in Fig. 3)

2 Mean rainfall (JJA)

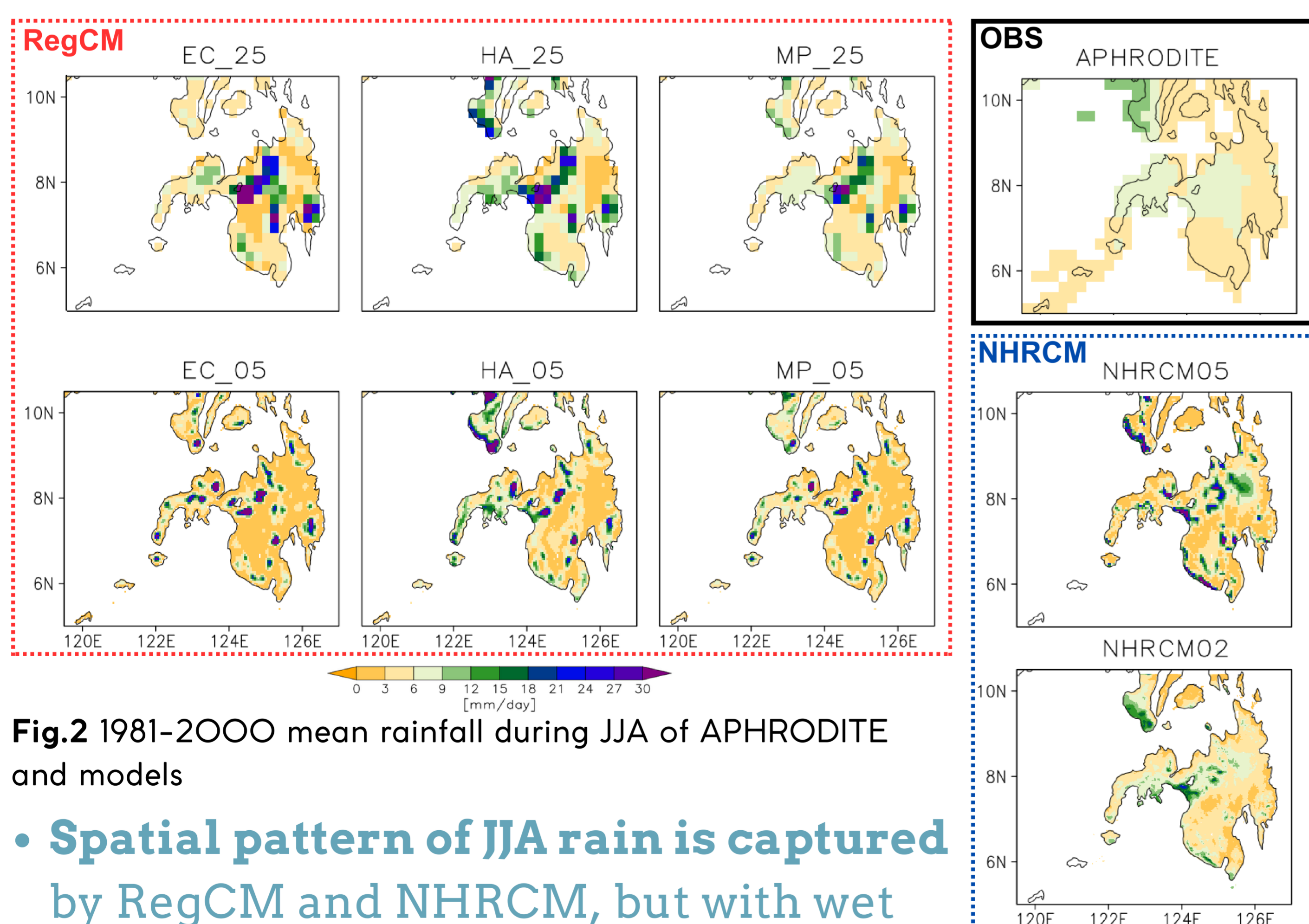


Fig.2 1981-2000 mean rainfall during JJA of APHRODITE and models

- Spatial pattern of JJA rain is captured by RegCM and NHRCM, but with wet bias especially in high elevations
- More pronounced wet bias with further downscaling to 5 km for RegCM
- Improved wet bias with further downscaling to 2 km for NHRCM

- CORDEX Southeast Asia aims to provide high-resolution climate projection data for key **vulnerable areas** in the region. **Mindanao** is chosen due to the high risk and vulnerability of its population and agricultural economy to future climate change.
- RegCM and NHRCM were used to downscale CMIP5 GCMs for Mindanao. The simulated mean rainfall in Mindanao showed wet biases against observations, with extremes largely overestimated.
- High-resolution observation data is key for an accurate assessment of model biases.

3 JJA daily rainfall distribution

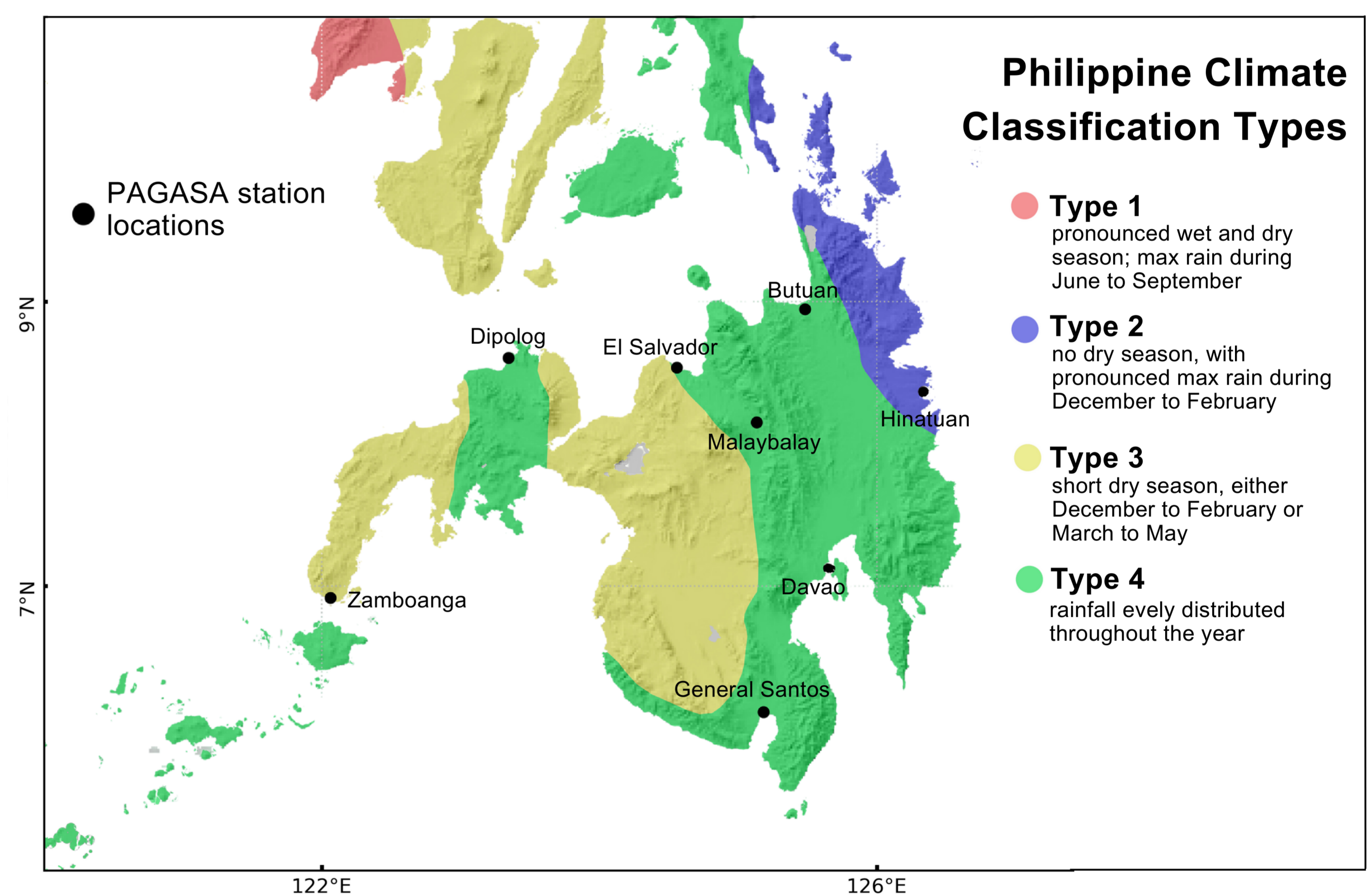


Fig.3 Modified Coronas climate classification with locations of PAGASA stations in Mindanao

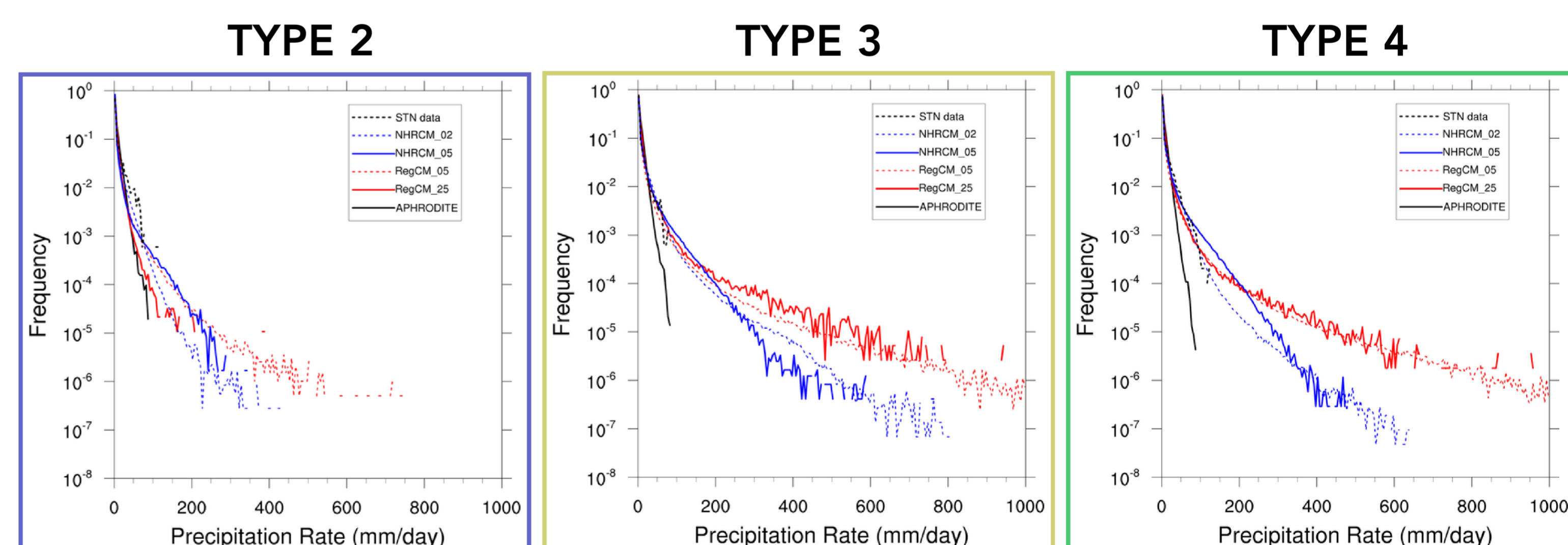


Fig.4 Distribution of daily rain per climate type in Mindanao (see Fig. 3)

- RegCM and NHRCM daily rainfall (< 100mm) comparable to PAGASA station rainfall, emphasizing the need for high-resolution observation data
- RegCM and NHRCM largely overestimate extreme rain (> 100 mm)

Acknowledgments

- Asia-Pacific Network for Global Change Research (APN) with project # CRRP2016-2MY-Santisirisomboon
- MEXT through the Japan Meteorological Business Support Center and Meteorological Research Institute (MRI)
- High-Definition Clean Energy, Climate, and Weather Forecasts for the Philippines (MO ECW project)
- ICRC CORDEX 2023 conference organisers and sponsors for J. Dado's participation

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- [2] H. Sasaki et al., SOLA 4, 25-28 (2008)