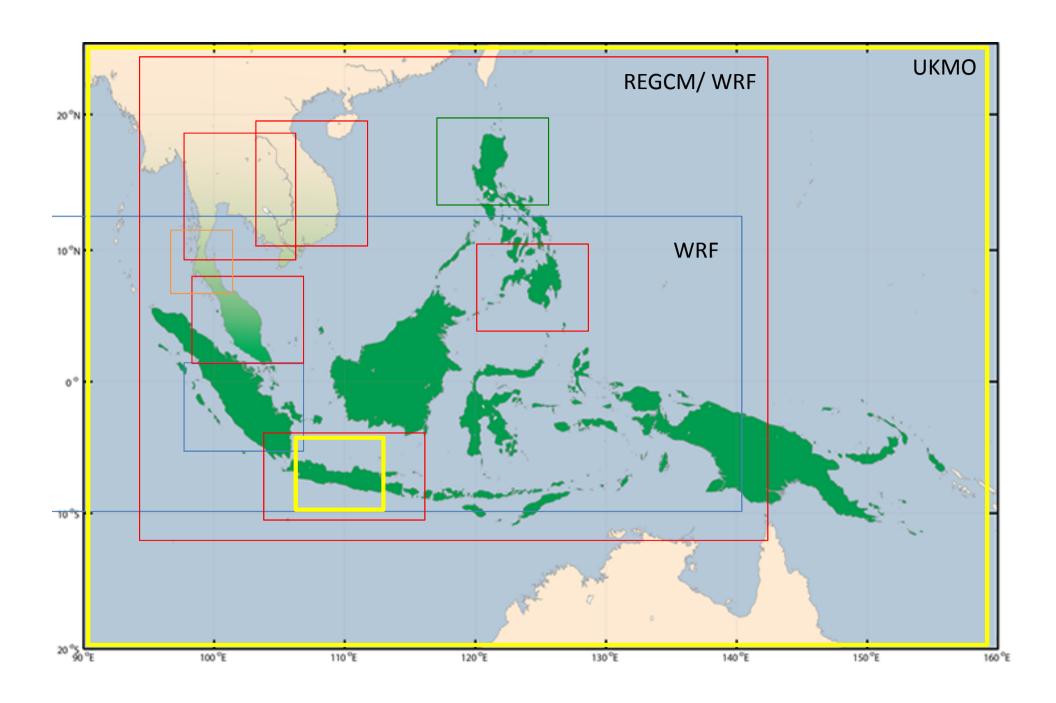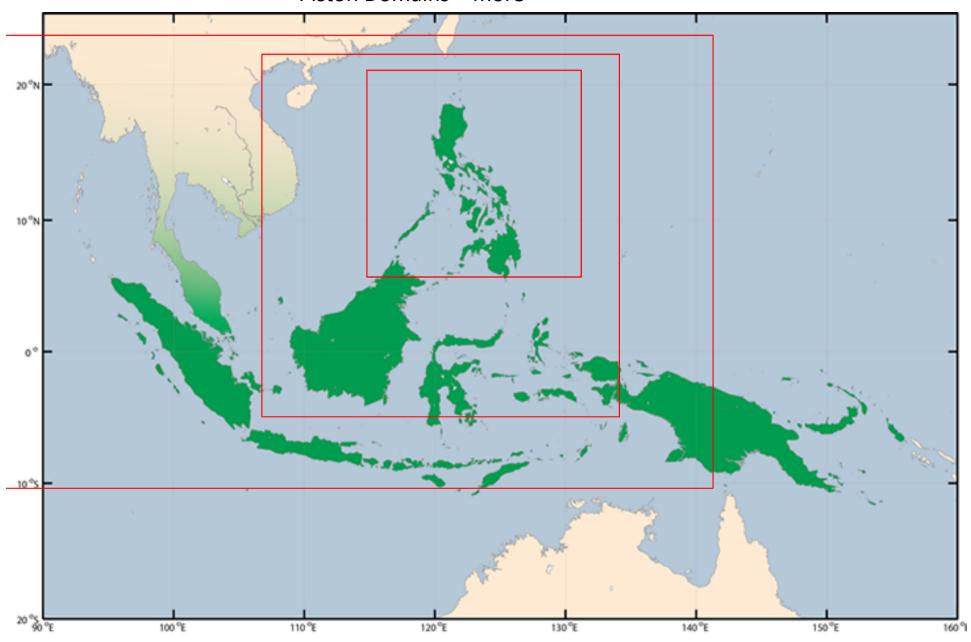# Modelling – YMC Breakout 2

Common scientific issues

- Interaction between ISO, MCS and diurnal cycle
- Fundamental processes governing diurnal cycle and organization
- Diurnal cycle systematic biases
- Observational datasets for model evaluation
  - Radar vs gauge vs satellite
- Initialisation & modelling of soil moisture / landuse / temperature
  - Diurnal cycle spin-up issues in forecasts & hindcasts:
- Ocean mixing in PISTON region, including tidal mixing, freshwater discharge, monsoonal interaction
- Aerosols cloud interactions in MC region
- Cloud – radiation feedback
- Troposphere / stratosphere interaction – e.g., QBO/ISO links
- Ocean / atmosphere interaction – how does this work at the mesoscale and how important is it for ISO, MCS, etc.?

Piston Domains + more

TOOLS

WRF
Unified Model
RAMS
COAMPS
REGCM
NICAM

LOCATIONS

Western MC
Philippines
Entire MC Domains

PERIODS
NDJ 2017/2018
MJJA 2018 (PISTON)
NDJ 2018/2019
NDJ 2019/2020
CORDEX 1979-2016 -- desirable 2015-2020

Opportunities for Collaboration and Coordination

- Synergies with models
  - Need a mechanism to facilitate this communication (e.g., webpage with table, sharing namelists etc.).
- Synergies with geographic region

- Overlapping periods for model comparisons

- Set of standard diagnostics - c.f. forecasting group, make sure comparing same things

Data Exchange

- Agreeing in principle that we are willing to share data
  - Individual collaborative projects

- Provide a list of simulations and datasets that exist and able to be shared through collaboration

- Agree about way to produce a small set of 'standard' plots to help summarize model outputs.
  - E.g., diurnal harmonic with same colour scales.

- Publish data on public repositories
  - Coarse-grain in time or space
  - Co-locate output with regions of intensive observations
  - Agree on appropriate metrics/variable (e.g., hourly rainfall)

Observational Needs

- RADAR, soundings, surface obs, etc.

- Rain gauges?

- Planetary Boundary Layer?

- Surface fluxes (land & ocean)?

Tekemi: Kyoto University
Hindcast – Mirai obs Nov 2017 – Jan 2018.
WRF – Large Domain entire MC, downscale over Sumatra < 1 km resolution
Focus on local thermally driven circulation & diurnal cycle

Yoden:
Idealised experiments – stratosphere/troposphere 2-way coupling
Idealised WRF model at quasi-equilibrium, aquaplanet global model (QBO/MJO)

Chen: National Taiwan University
SPCAM, CAM5 climate runs, examining east asia summer monsoon. Organized convection interaction with monsoons.
Interested in hindcast experiments. Idealized CRM land-ocean atmosphere interaction (motivated by south china sea).

Fredolin: Malaysia
CORDEX-SEA contribution to AR6. 20 km from 1970, downscaling ERAInterim/CMIP5 models. Downscale domains to 2km.

Phillipines: CAMPEX period, July-Sept 2018. WRF down to ~1km. Land / atmosphere interaction

Thailand: Southern part of Thailand. Downscale from NCEP-FNL using WRF down to 10 km + WRF-Chem. December / Jan 2017/18 & 2018/19. Aerosol cloud interactions.

UK: Unified Model, 100 m resolution over Java for a few days. Larger domain covering entire MC at 12 km resolution & O(4km).

CNRM: Climate models in hindcast, Dec 2017 – onwards, convection in the MC and how it incluences large scale. CNRM-Model at 0.5 degree resolution. Mesoscale simulations with smaller domains

Indonesia: Downscale with WRF over Java at 3 km. Daily forecast.

Piston: Oregon State Coupled LES convective outflow interaction with Ocean KPP model. NASA 1D simulations, Colorado State University nested domain. with RAMS finest resolution 1 km. Columbia University WRF – land-topography interactions. Convective outflows (Conneticut Unive) also with WRF. NRL Using COAMPS (Coupled) down to 1.33 km with 1/8 degree wave model., 2016, 2017, 2018 (real time forecast July / August). River discharge sensitivity, hydrology development of capability to couple with NASA-LIS. 5 groups already have resources.

NICAM: 2 week near real time 14 km, month long 7 km, 3.5 km hindcast for events, ocean coupled run (in development). GLOBAL. Mirai Nov-Dec-Jan 2017/18

Australian: Nov 2018- Jan 2019