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# Exploiting kilometer-scale grid spacing for climate simulations over High Mountain Asia

EGU General Assembly 2022

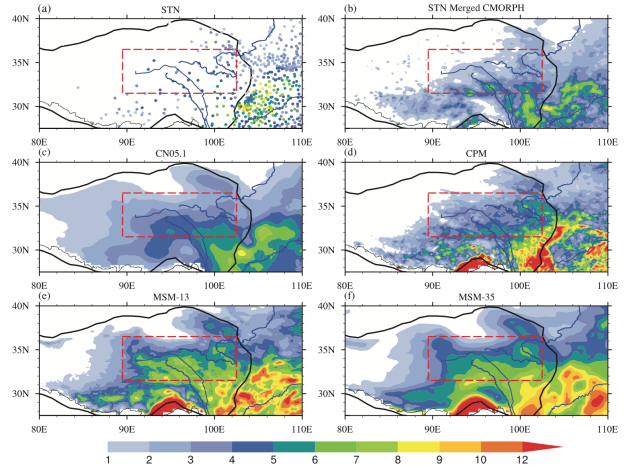
Emily Collier and Nikolina Ban

# Motivation

Conventional climate models have persistent biases over the Tibetan Plateau

Refining the horizontal grid spacing to kilometer-scale in atmospheric models:

- improves terrain and process representation
- allows for explicit resolution of deep convection



Li et al. (2021)

# kmMountains: Mountain Climate at the Kilometre-Scale Resolution

## Project goals:

- Perform one of the first kilometer-scale decadal climate change simulations for High Mountain Asia
- Investigate the impact of model resolution on process representation
- Assess how mountain climate will change with further warming

Contributes to the CORDEX Flagship Pilot Study  
Convection-Permitting Third Pole (CPTP)



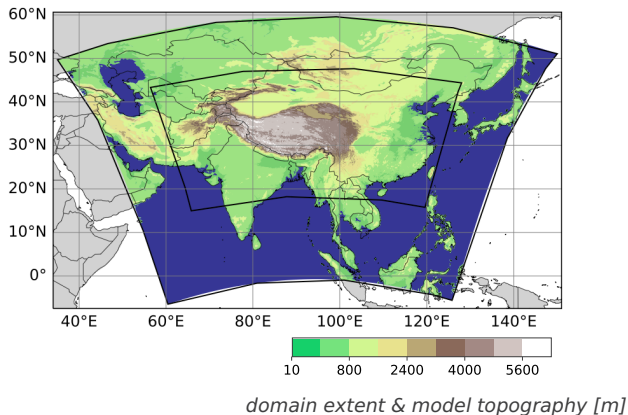
# Simulations

**Model:** COSMO (CONsortium for Small-Scale MOdelling) climate model (COSMO-CLM) v.5.0n1

**Domains** (one-way nested):

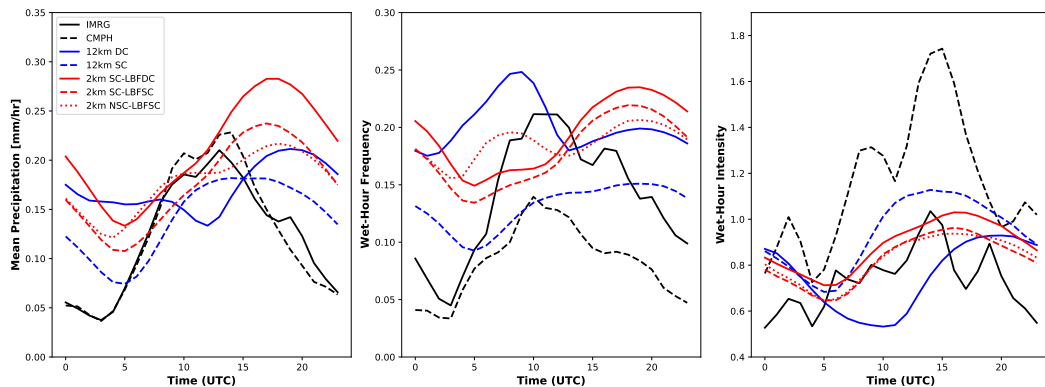
- 12-km domain
  - grid dimensions 700x550x60
  - deep convection scheme
- 2.2-km domain
  - grid dimensions 2640x1475x60
  - shallow convection scheme

**Forcing:** ERA5 ( $\sim 31$  km, 3hrly)



# Role of Convection Parameterization

## Core Monsoon Season – JJA 2018 – Precipitation diurnal cycle above 2500m



# Outlook

Further work to understand differences in simulations

CPTP FPS Milestones:

- Submitted manuscript on case-study simulations
- Current phase: analysis of hydrological year simulations
- Final phase: decadal historical and scenario simulations

Data will be made publically available after an initial publication for each phase

