A preliminary assessment of convection-permitting simulations over southeastern South America performed with the WRF model

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Background

- Extreme precipitation events over Southeastern South America (SESA) during the spring and summer are responsible of more than 80% of the total accumulated seasonal precipitation.
- These extreme events are associated with the occurrence of organized convection in the region and with anomalous moisture flux convergence

Challenge: Modelling extreme precipitation features

Objective

To assess the capability of a convection-permitting resolution regional climate model simulation in capturing ***extreme precipitation events over SESA.***

WRF Model Set up

SW Radiation: RRTM
LW Radiation: Dudhia
Land Surface: UNoah
Shallow cumulus: Grimms

	WRF4C1	WRF4C2	WRF20
Microphysics	WDM6	WSM6	WDM6
PBL	YSU	MYNN3	MYNN3
Surface Layer	Rev. MM5	ETA S	ETA S
Cumulus	-	-	Grell-Freitas

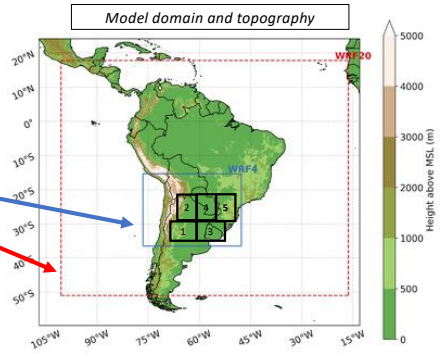
Approach

- Two ensemble members **6-month length simulations** with the WRF-ARW model (3.9.1) at **4 km** resolution covering the period **01OCT2015-31MAR2016** **(WRF4C)**
- WRF-ARW at **20km** resolution simulation over the CORDEX-SAM domain (**WRF20**)
- Initial and boundary conditions: ERA-Interim reanalysis

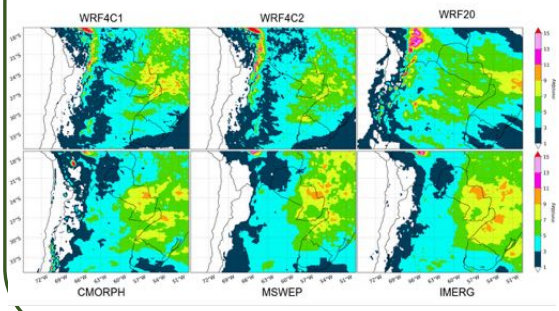
Data

- 3-hourly precipitation data from MSWEP, CMORPH and IMERGE satellite data

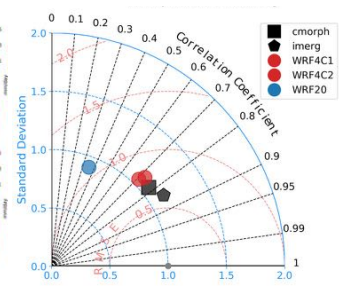
Model domain and topography



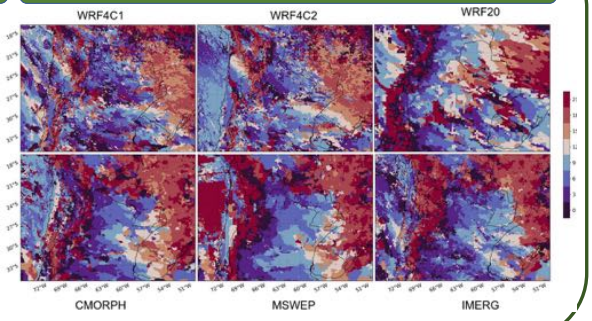
Mean precipitation



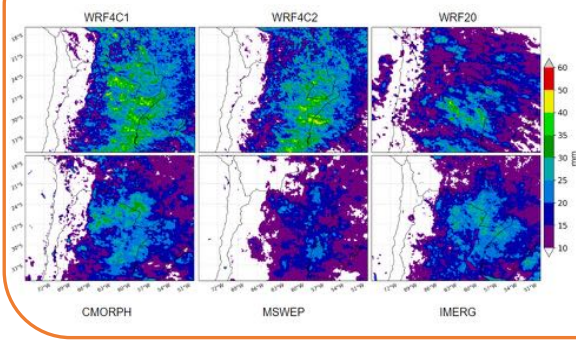
Precipitation intensity



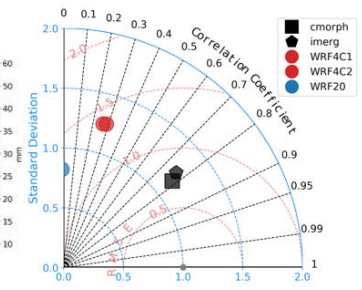
Time of the daily maximum precipitation



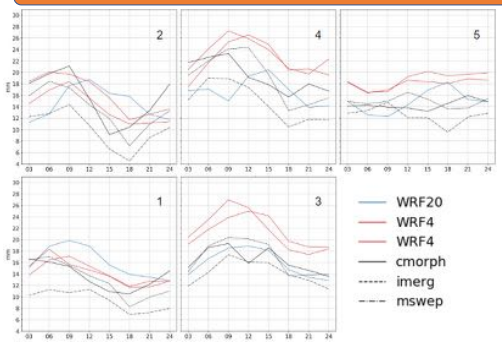
The 95th percental of 3-hourly precipitation



Intensity of precipitation > p95



Diurnal cycle of extreme precipitation



Concluding remarks

- Large spread among different observational datasets in representing the spatial distribution and intensity of the mean and extreme precipitation in the SESA region.
- Convection permitting simulations outperform the 20km simulation in terms of the mean precipitation, the mean intensity and extreme precipitation.
- Major improvements in the convection permitting simulations are apparent in the timing of extreme precipitation.

Acknowledgements

- UBACYT2018 Grant 20020170100117BA
- Fondo para la Investigacion Científica y Tecnologica, Grant PICT2018-02496
- Datasets providers (CMORPH, MSWEP, IMERGE)

P.1.8