

Ensemble of numerical models for rainfall and temperature estimation in Bolivia using RegCM 4.7



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Introduction

An ensemble of five numerical models has been developed using RegCM 4.7 to reproduce the spatio-temporal regime of precipitation and temperature in Bolivia between 2005-2015. Three domains was considered: the first one for CORDEX SA (30 km resolution), the second one covering the entire Bolivian territory (10 km resolution), and the last one covering the Central Bolivia Region (the department of Cochabamba, 5 km resolution).

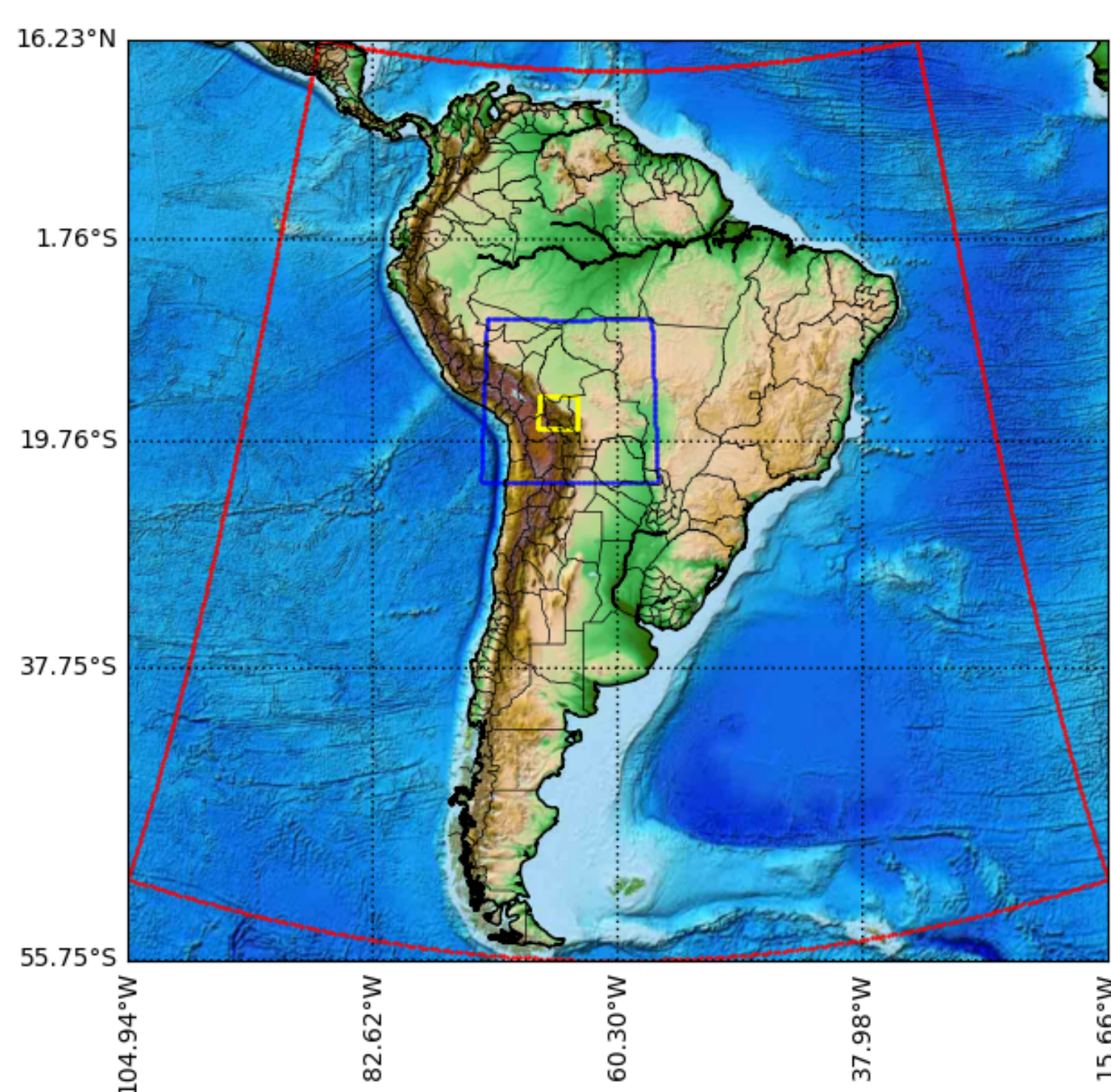


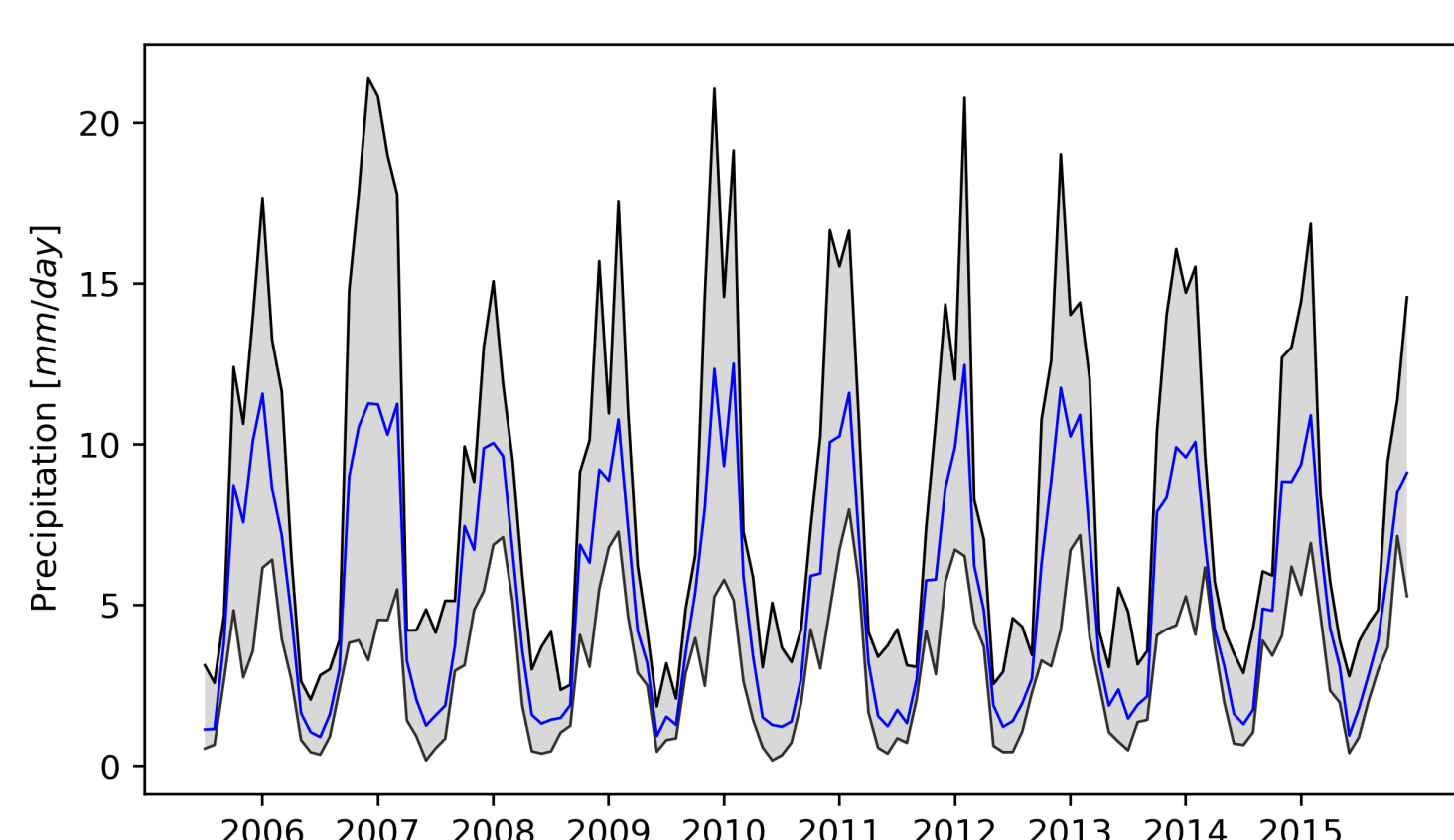
Figure 1. Domains used for the ensemble

Models configuration

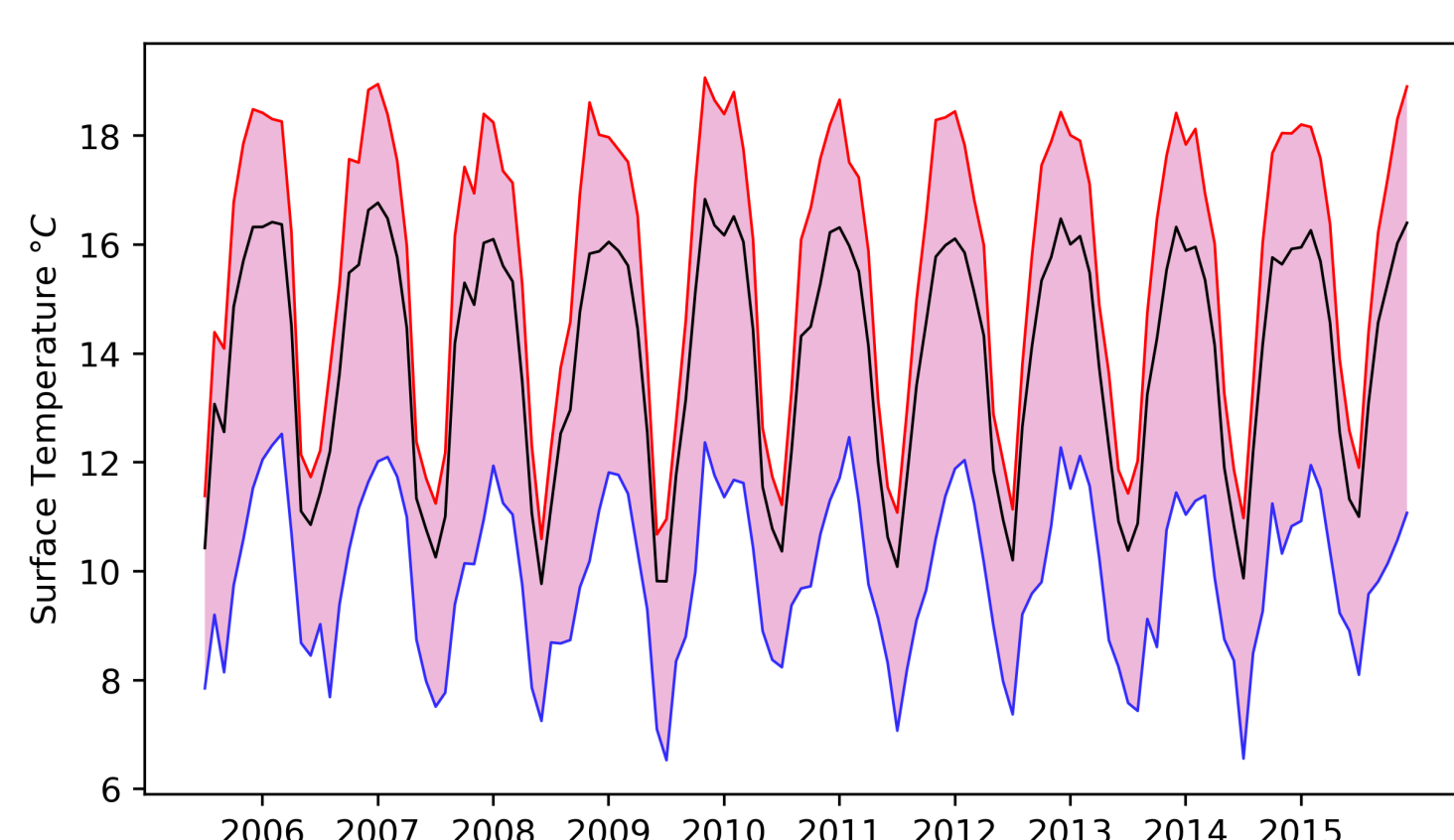
Name	Resol. (km)	Conv. Sch.	L/O	MicroPhys.
sensit01	30, 10, 5	Grell/Emanuel	SUBEX	SUBEX
sensit02	30, 10, 5	Emanuel/Grell	SUBEX	SUBEX
sensit03	30, 10, 5	Tiedtke/Tiedtke	SUBEX	SUBEX
sensit04	30, 10, 5	Grell/Kain-Frit.	SUBEX	SUBEX
sensit05	30, 10, 5	Grell/Emanuel	Nog./Tomk.	SUBEX

Table 1. Ensemble models configuration

Ensemble Results



(a) Ensemble Mean Precipitation



(b) Ensemble Mean Surface Temperature

Models Evaluation

We use ERA5 for the contrast of each model. The bias with respect to ERA5 for precipitation and temperature in the finest domain is shown below both, for rainy and dry seasons. We note that the spatial resolution of the models greatly affects the result: low resolutions do not correctly capture the topography of the study area, they fail to perceive abrupt altitudinal changes such as those experienced when moving from the central valley to the high plateau, mountain range, and departmental tropics.

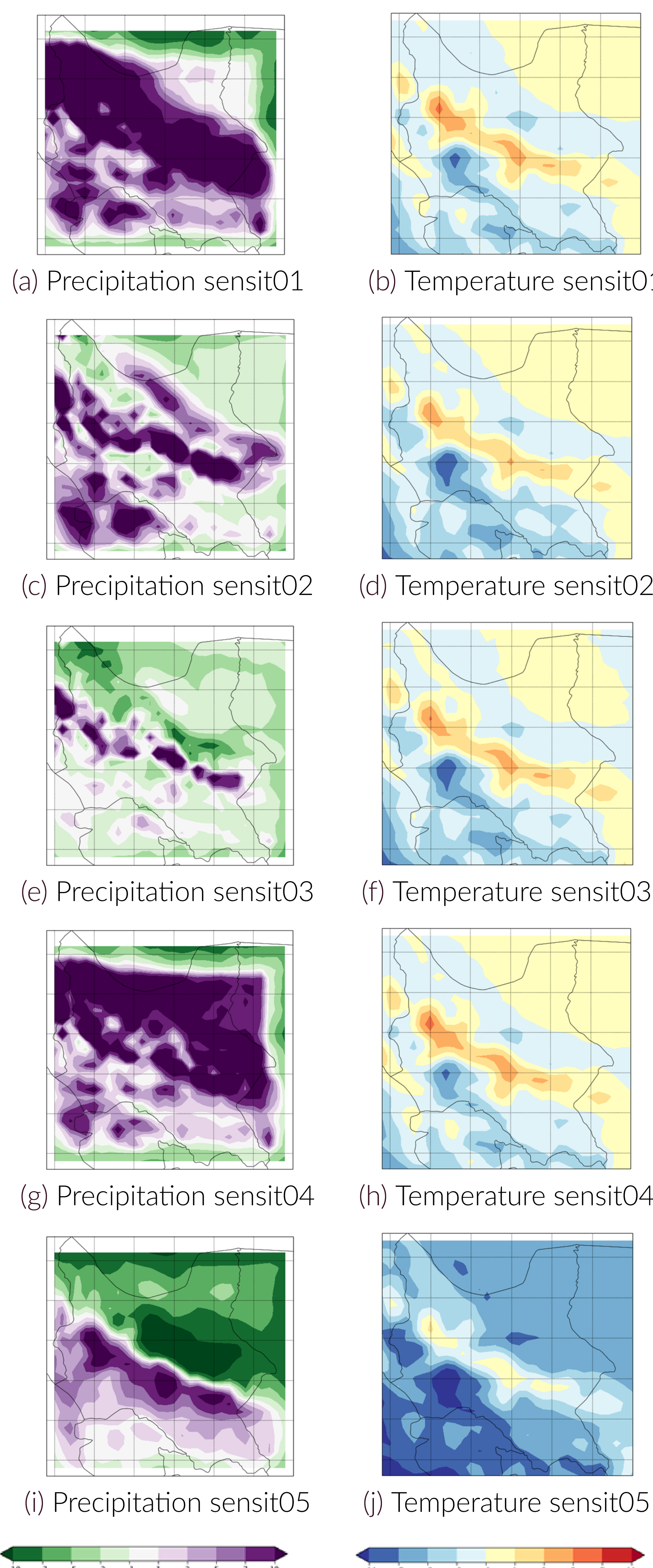


Figure 3. Bias for the Rainy Season

Conclusions

It was evidenced that the sensit03 model that corresponds to the Tiedtke convective scheme, applied both on land and in the ocean, is the most suitable to represent the abrupt altitudinal change that is located on the border between the sub-Andean region and the tropics for estimating precipitation and temperature in the Central Region of Bolivia.

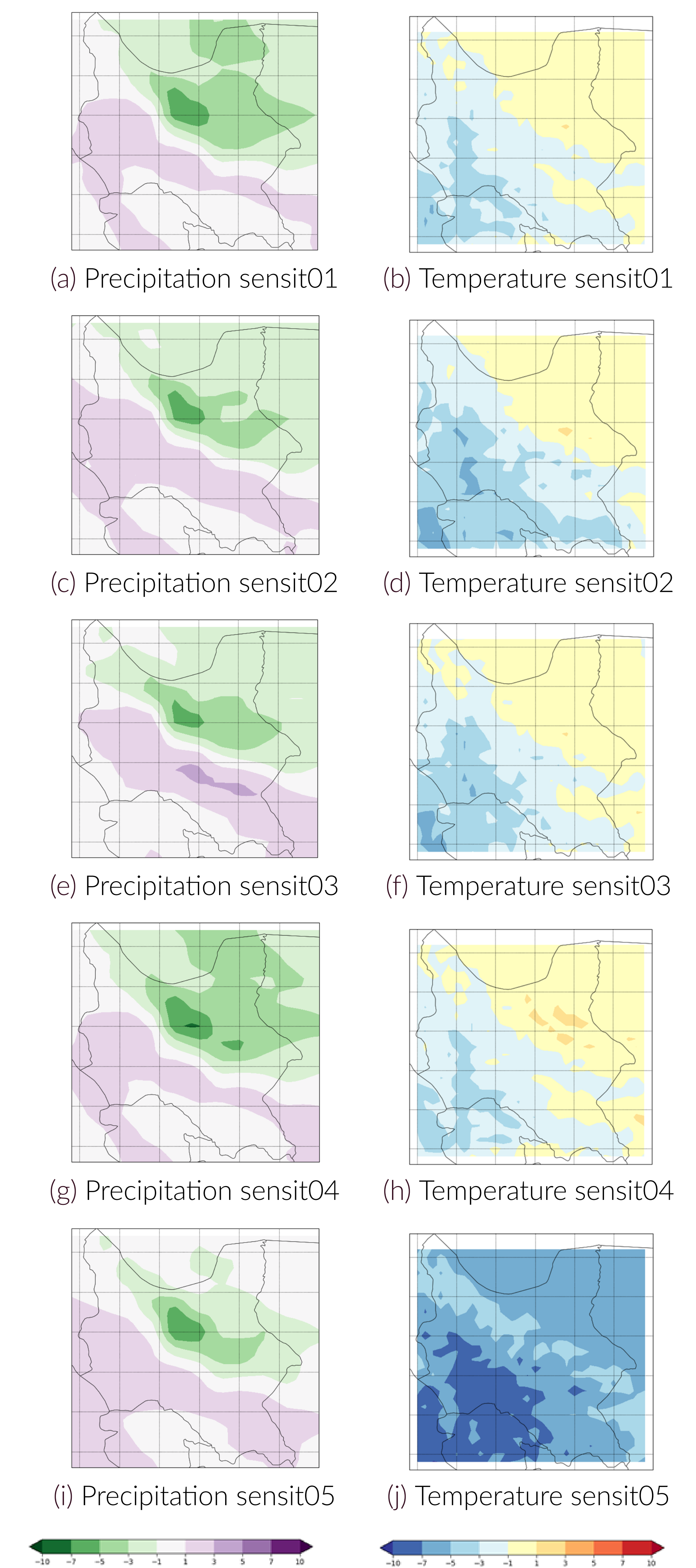


Figure 4. Bias for the Dry Season

Acknowledgments

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References

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