Prologue

The current volume of Física de la Tierra addresses the study of climate variability and teleconnections over West Africa and the Mediterranean sector, over a wide range of timescales, from interannual to multidecadal. Because of different reasons, these two regions are very sensitive to climate variability and change. On the one hand, in West African countries the economy is greatly dependent on rainfed agriculture, and thus it is ultimately related to precipitation, which is mainly controlled by the West African Monsoon (WAM) that occurs in boreal summer. On the other hand, the Mediterranean region is known to be particularly vulnerable to climate change, because an increase in the climate extremes in the region is expected. Moreover, due to its particular location, between tropical regions and mid-latitudes, the Mediterranean is affected by two different dynamics, which makes its study a difficult task.

This issue begins with two papers that summarize the state of the art of the knowledge of climate variability and teleconnections over West Africa and the Mediterranean. First, the work of Lopez-Parages et al. is a thoroughly review of the state of the art of the different atmospheric and oceanic teleconnections influencing West Africa and the Mediterranean, as well as their multidecadal changes, specially focused on the work performed by TROPical Atlantic variability group at the Complutense University of Madrid. Second, Gaetani et al. describe the climate teleconnection between West Africa and Mediterranean regions, highlighting the observational evidences and the dynamical mechanisms underlying the teleconnection. Through a broad review of the recent literature, the influence of the Mediterranean Sea thermal anomalies on the WAM dynamics is robustly demonstrated, and a WAM modulation of the atmospheric circulation over the Euro-Atlantic sector is also evident.

García-Serrano et al. focus on the study of the first mode of variability of the tropical Atlantic Ocean, the Atlantic Niño. This SST pattern has a strong influence on the WAM, and is also able to trigger teleconnections that impact the Mediterranean region. They present for the first time an exploration of the reliability for decadal prediction of the Atlantic Niño, finding that, although still low, the initialized predictions have better skill than the uninitialized ones.

The two following works are centred in the study of West African climate. Regarding seasonal predictions of summer rainfall over West Africa, Rodrigues et al. analyze the skill of three state-of-the-art seasonal prediction systems: ECMWF System 4 (S4), NCEP CFSv2 (CFSv2), and Météo-France System 3 (MF3). They present a novel approach assessing the skill of the systems in reproducing the main modes of variability of monthly rainfall averaged in the 10ºW-10ºE region. They show that the first two modes, which represent the Guinean and Sahelian rainfall regimes, respectively, are skilfully predicted by the S4. In turn, MF3 can only skillfully predict the Guinean mode and CFSv2 shows no skill for the Guine-

an one and only moderate correlations with the Sahelian one. The work by Kucharski and Zeng addresses the important issue of the Sahel drought that peaked in the 1980's and that is one of the strongest signals of decadal variability recorded in the 20th century. The study is focused on the impacts of vegetation feedbacks on Sahelian precipitation, using idealized simulations from an AGCM coupled to a dynamic vegetation model in which prescribed albedo and vegetation cover are perturbed. According to their results, the positive feedback of albedo, in which an increase of albedo reduces the surface net radiation, the latent heat flux and thus rainfall, is the dominant mechanism at work. Nevertheless, one can't neglect the effect of moisture divergence in the drought.

The two last works of this issue are focused on the Mediterranean region. The work by Polo et al. focuses on preferred states of the atmosphere over the Euro-Atlantic sector and the Mediterranean region through the use of Weather Regimes (WR). The authors show that simulations from Atmospheric General Circulation Models that use prescribed SST as boundary conditions can capture the main WR, though they also present some biases in their spatial structure and seasonality. By using such simulations and observations they investigate the change of WR in the Euro-Mediterranean area under anomalously warm and cold conditions over the Mediterranean Sea. Their analysis suggests that extreme conditions over the Mediterranean might modulate WR frequencies, which, in turn, could have an impact on European weather conditions. Finally, Lopez de la Franca et al. provides a regional study of the dry spells in the Mediterranean basin, and the expected changes under climate change conditions. They find that the regional models show an increase in the length of the annual mean dry spells under the A1B scenario. Such an increase could be related to droughts and needs to be accounted for in the management of water resources.

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