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Seasonal forecasts for the agricultural sector in Peru through user-tailored indices

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In the agricultural sector, the demand for seasonal forecast information is high since agriculture depends strongly on climatic conditions during the growing season. Unfavorable weather and climate events, such as droughts or frost events, can lead to crop losses and thereby to large economic damages or life-threatening conditions in case of subsistence farming. The generally used presentation form of tercile probabilities of seasonally averaged meteorological quantities are not specific enough for end users. More user-tailored seasonal information is necessary. For example, warmer than average temperatures might be favorable for a crop as long as they remain below a plant-specific critical threshold. If, on the other hand, too many days show temperatures above this critical threshold, a mitigation action such as e.g. changing the crop type would be required.

In the framework of the CLIMANDES project (a pilot project of the Global Framework for Climate Services led by WMO [http://www.wmo.int/gfcs/climandes]), user-tailored seasonal forecast products are developed for the agricultural sector in the Peruvian Andes. Such products include indices such as e.g. the frost risk, the occurrence of long dry periods, or the start of the rainy season which is crucial to schedule sowing. Furthermore, more specific indices derived from crop requirement studies are elaborated such as the number of days exceeding or falling below plant specific temperature thresholds for given phenological stages.

The applicability of these products highly depends on forecast skill. In this study, the potential predictability and the skill of selected indicators are presented using seasonal hindcast data of the ECMWF system 4 for Peru during the time period 1981-2010. Furthermore, the influence of ENSO on the prediction skill is investigated. In this study, reanalysis data, ground measurements, and a gridded precipitation dataset are used for verification. The results indicate that temperature-based indicators show sizeable skill in the Peruvian highlands while precipitation-based forecasts are much more challenging.