

Regional Climate Monitoring: Current State and Perspectives

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Regional climate monitoring is relevant for both producers and users of climate information. For operational activities, monitoring is needed to better characterize the current climate status for a particular region and to underpin the regional climate prediction that can still have limited skill. On the other hand, there are many socio-economic sectors sensitive to climate variability that besides climate prediction information; they also need real-time monitoring of climate variables to trigger interventions, and analyses of historical trends and variability to identify emerging risks.

Climate monitoring products are being provided in Latin America and the Caribbean (LAC) by a diversity of institutions including not only national meteorological services, but also other organizations. The monitoring products available are very diverse and for many regions they are still at an infancy stage. On the other hand, significant progress has been made in better describing and understanding the climate variability of the LAC region by the academic-scientific sector particularly that involved in many WCRP Programs, like the "Variability of the American Monsoon System" (VAMOS). However, such knowledge has not been yet used enough by the operational agencies related to climate monitoring, for improving and expanding their products and activities. The implementation of many regional climate centers by the World Meteorological Organization (WMO) is currently happening and the discussion of a regional climate monitoring framework is then urgently needed. This provides an excellent opportunity for the academic-scientific research community to underpin this process. Specific examples of some of the monitoring activities in which the recently gained scientific knowledge on climate variability in the LAC region can contribute are briefly discussed.

Information about climate variability on intraseasonal timescales is quite relevant for many of the LAC regions, particularly when there are no significant climate signals on seasonal timescales, like those induced by El Niño-Southern Oscillation. During the last years, significant progress has been made in describing and understanding the dynamics of the Madden-Julian Oscillation (MJO) and its influence over the Americas. Moreover, MJO prediction has been improved extensively, although the skill of MJO impact prediction is still limited. MJO can explain a significant portion of the regional climate variability in the Americas. However, with few exceptions, there is a lack of climate monitoring on intraseasonal timescales for many LAC regions.

It is well known that ENSO explains a large portion of the climate variability on seasonal timescales for many LAC regions. However, investigations show that there are other significant sources of seasonal climate variability related with other ocean basins, land surface conditions, large-scale teleconnection patterns (e.g. Southern Annular Mode, Pacific-South America patterns), etc. However, monitoring products describing the impact of those sources of variability on regular basis are almost inexistent for many LAC regions.

Recent investigations have provided valuable knowledge about the climate variability on decadal and longer timescales in the LAC region, as that induced by the oceans. In addition, analyses of long-term climate trends have been performed extensively in the context of climate change related research. This knowledge about year-to-year climate variability can also be of relevance for monitoring purposes. However, its translation in monitoring products is very limited.

During the next years, WCRP future activities in the LAC region should include the implementation of short projects that help to accelerate the co-design and co-production of monitoring products based on the research conclusions described above. Such collaborative work might have two different strategies. On one hand, projects can be implemented in which researchers work together with personnel of the national meteorological services or regional climate centers in elaborating conceptual models of the regional climate variability and in developing indexes or other products to monitor it. Capacity building and training should be an essential component of these projects, considering that such new knowledge of the climate variability resulted from investigations, cannot be that known by the personnel of the operational centers. On the other hand, projects to develop monitoring products to address the needs of specific socio-economic sectors might also be implemented in which researchers, personnel of operational climate monitoring agencies and experts of the socio-economic sectors co-design and co-produce new and innovative monitoring products valuable for sector decision-making.