Geophysical Research Abstracts
Vol. 17, EGU2015-14802-1, 2015
EGU General Assembly 2015


# Weather-type downscaling of seasonal predictions to daily rainfall characteristics over the Pacific-Andean basin of Ecuador and Peru

Luis Pineda and Patrick Willems
KU Leuven, Department of Civil Engineering, Hydraulic section

A weather-type downscaling of seasonal predictions to daily rainfall characteristics is conducted over the Pacific-Andean region of Ecuador and Peru (PAEP) in NW South-America using a non homogenous hidden Markov model (NHMM) and retrospective seasonal information from general circulation models (GCMs). First, a HMM is used to diagnose four states which play distinct roles in the Dec-May rainy season. The estimated daily-states fall into one pair of wet states, one dry and one transitional dry/wet state, and show a systematic seasonal evolution together with intra-seasonal and inter-annual variability. The first wet-state represents region-wide wet conditions, while the second one represents north-south gradients. The former could be associated with the annual moisture off-shore the PAEP region, thermally driven by the climatological maximum of sea surface temperatures in El Niño 1.2 region. The latter corresponded with the dynamically noisy component of the PAEP rainfall signal, associated with the annual displacement of the Inter-tropical convergence zone. Then, a 4-state NHMM is coupled with GCM information to simulate daily sequences at each station. Simulations of the GCM-NHMM approach represent well daily rainfall characteristics at station level. The best skills were found in reproducing the inter-annual variation of seasonal rainfall amount and mean intensity at regional-averaged level with correlations equals to 0.60 and 0.64, respectively.