*Forecasting the weather
- ensemble techniques
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Adaptation for tropical regions of a Statistical Downscaling technique

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Nowadays, the General Circulation Models (GCM) are the main tool to simulate the most relevant aspects of the future climate. These models are able to reproduce general features of the atmospheric dynamics but their low resolution (about 200 Km) does not allow a proper simulation of lower scale meteorological effects. Downscaling techniques allow to overcome this problem by adapting the model output to local scale. A statistical downscaling technique based on a two-step analogue method has been developed by FIC (Climate Research Foundation). This method has been broadly tested on national (Spain) and international projects (EU project ENSEMBLES) leading to excellent results. FIC's statistical downscaling method was implemented for medium latitudes, so the predictors were chosen taking into account the optimal atmospheric fields for these latitudes.

Our aim is to describe the process of adapting the statistical downscaling method developed by FIC to tropical climates. To achieve this goal the atmospheric fields (predictors) that best describe the atmospheric settings that affect tropical regions have been selected. In general terms, FIC's methodology is based on a two-step analogue method, in order to establish linear relationships between low-resolution fields (atmospheric patterns at different levels) and high-resolution variables on surface (daily temperature and precipitation). In the first step, the most analogous days to the "problem day" are selected attending the selected predictors (low resolution fields like, eg, geopotential or wind at different levels). The selected predictors for tropical regions are the zonal and meridional Wind components at the levels of 1000, 700 and 200 hPa. In a second step, a multiple linear regression between predictors and predictands (temperature and precipitacion) is made, using the following potential predictors: geopotential height thickness (1000-850 and 1000-500) and relative humidity at 850 hPa.

For the verification process (assessment of the capacity of the methodology to simulate past observed climate), NCEP Reanalysis, and observed daily series of maximum and minimum temperature and precipitation from the INETER (Nicaragua's metoffice) are used. For the validation process (assessment of the capacity of the differents General Circulation Models, GCMs, to simulate past observed Climate), the GCMs ECHAM5 (from the Max-Plank Institute), CNCR3 (from Centre National de Recherches Meteorologiques) and BCM2 (Bjerknes Centre for Climate Research) are used.

The result of both tests (verification and validation), applied to the adapted downscaling method for tropical regions, are very robust (they are even quite better than for mid-latitudes -from other studies over Spain and Europe-). These results are better for temperature than for precipitation.

Once verification and validation are succesfull, future climate local scenarios have been produced all over Nicaragua.