



Climate Change Scenarios in the Yucatan Peninsula to the year 2020

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A topic that has not been sufficiently analyzed is that the global warming is already affecting, and that it will have worst consequences in those regions with transitional climates, which have more sensibility to changes. This is the case of the Yucatan Peninsula which is semi-arid in their northern portion, and toward the south is subhumid, with a tendency to be more rainy toward the south.

To have an estimation of what could happen in the future, the Intergovernmental Panel of Climatic Change (IPCC) has promoted the use of General Circulation Models (GCM), as well as the construction of possible emission scenarios that integrate different global and regional socioeconomic and demographic conditions, which project then a possible increase of emissions of greenhouse gases. These conditions are recognized as the decisive forces that will determine the variations of temperature and of precipitation. These projections are useful for the analysis of climatic change, and in particular for the assessments of the possible impacts and of the initiatives of adaptation and of mitigation that should be implemented in every country or region. In Mexico, most of those evaluations of climate change have been carried out generally at country level. For that reason, it is necessary to direct the research at regional level.

In this work, we evaluated the potential climatic changes on the Yucatan Peninsula, considering the different changes of temperature and precipitation as a consequence for different emission scenarios and for the horizon 2020. To project the environmental responses of the region, we used as a base scenario the available temperature and precipitation information of the period 1961-1990, registered in 85 meteorological stations of the peninsula. With these data, we generated climate change scenarios using the outputs of four General Circulation Models: HADLEY, ECHAM, GFDL and CGCM, and the emission scenarios A1FI, A2, B1 and B2. The outputs of these models were introduced in a Geographical Information System (GIS), represented cartographically and were corroborated geostatistically. The results are shown through a collection of maps that constitutes the possible changes of the different elements of the climate under ten possible climate change scenarios. One main result that we obtained was that for the horizon 2020, there is great uncertainty on the temperature increments and on the changes of the projected precipitation amounts.

Even with that uncertainty, extreme climatic scenarios were obtained. For example, the scenario generated with the Hadley model, and with the emission scenario A1FI, projects that the distribution of climates will radically change in the peninsula. The region with climates BSo w, which is the driest of the semi-arid climates, will extend from Sisal to the east of Río Lagartos, in the area of San Felipe. Also, this scenario projects that the Awo w” warm climate, will be distributed in the occidental middle portion of the peninsula, from Mococho and Mérida in the north, and to the boarder zone of Campeche and Guatemala, in the south. The Ax’(wo) w” climate will be present in a very extended area, from the east of the state of Yucatán, until the east of Campeche and the west of Quintana Roo.

The cartographic representation of the ten possible scenarios will allow us to contrast the possible climate change scenarios, and could support the localization of the most vulnerable areas, and to determine also what kind of adaptation and mitigation measures should start to be established i for regions and sectors that are very relevant in the peninsula, such as rainfed agriculture, apiculture (beekeeping), achiote production, and eco-tourism, for example.