WEATHER SHORT RANGE FORECASTING AT IDEAM, COLOMBIA

Humberto Gonzalez
Head, Weather Forecasting and Warnings Office
Institute of Hydrology, Meteorology, and Environmental Studies, IDEAM, Colombia

Colombia is a country situated at the northwestern corner of South America with a surface of 1.141.748 km^2 and a population of 43.700.000 persons. The capital Bogotá has more than 6.000.000 people. The territory is crossed from south to north by three mountains ranges (western, central and eastern) that conform the Andean Cordillera, where most of the people live. Nevertheless, there are lowlands to the Caribbean coast, to the Pacific ocean and to the Orinoco basin.

Due to the proximity to the equator and the mountain relief the daily weather is controlled mainly by the local circulations and diurnal cycles of temperature and rainfall. The values of these parameters are associated normally to the height of the place. The rainfall variability along the country is very pronounced with values as low as 500 mm. in the Guajira Peninsula and as high as 15000 mm. in the central Pacific region. The seasonal climate is controlled by the movement of the Intertropical Convergence Zone that crosses the country two times per year generating two wet seasons (March-June and September-November) and two dry seasons (July-August and December-February) in the Andean region. Other climatic regions tend to have at least one wet and one dry season. These periodical seasons tend to be modulated by ENSO phenomena, making them shorter or larger, severe or mild depending of the intensity of warming or cooling of the Pacific ocean. In particular strong LA NIÑA cooling make wet seasons more severe with more flash flood and mud slides in the Andean region

The orography, the site exposure to the prevailing winds, and the proximity to ocean have determined several climate regions. The central Pacific region is the wettest place in South America. Being a mountainous country, the territory is subject to extreme hydrometeorological phenomena like land slides, grad, flash and slow floods, avalanches, hurricanes and minitornadoes with high impact over populations. Phenomena like forest fires and frost are also possible once dry season has developed.

Activity of the Intertropical Convergence Zone determines in great way the intensity and duration of the seasons. From time to time meteorological systems from middle latitudes like tails of cold fronts, Azores and Bermuda High, meteorological systems from the southern hemisphere can change abruptly the short weather forecasting. But many of the severe weather phenomena are determined by local wind circulations created by the complex topography that give rise to upward motions.

The Colombian meteorological service operates a surface synoptic network of 28 stations, located mainly at airports, with 7 of them working 24 hours. The upper synoptic network is composed of 5 stations. About 250 DCPs support the warning activities. GOES and NOAA

meteorological reception is available. No radar capability exists in Colombia for meteorological purposes.

For operative short weather forecasting, meteorologists make use of the NWP outputs from Global forecasting system (GFS) model from NOAA. The final national forecast is a consensus between the global model and the results from mesoscale model MM5 adapted for Colombia. Today we prepare: weather forecasts (up to three days) for the main cities and for the 4 main geographical regions

There is a unique National Center for preparing weather forecasting and warnings. The warnings include an assessment and monitoring of the soil state with respect to possibility of landslides and forest fire conditions. Additionally, the center issues warnings related to flash and slow floods for the main streams. In the case of flash floods there are big difficulties in timing the beginning and ending of the events due to short temporal and reduce space scale. The use of global and regional models is not enough for determining the exact place and time for severe weather phenomena. Most of the villages and towns in Colombia are situated in stepped terrain. The increasing population and non planned development are factors that have increased the vulnerability though actually municipalities must have a local land use planning. The hurricane warnings are coordinated through National Hurricane Center in Miami.

Once a warning or watch has been issued by IDEAM there are four users with priority: National Office for Prevention and Disaster Management DPAD; Civil Defense; Red Cross, Presidency of Colombia.

In relation to the flow of hydrometeorological warnings the DPAD is connected to 32 Regional Committees for Prevention and Disaster Management called CREPADs. At the same time CREPADs coordinate the warnings with local Committees for Prevention and Disaster Management called CLOPADs. Public and private institutions and also communitarian organizations conform the Prevention and Attention National System (SNPAD)

Concerning the seasonal forecasts, IDEAM prepares every month a general climate seasonal forecast- up to six months, using models from international climate centers available on the Internet network.

Nowcasting

Some words about nowcasting in Colombia. When we are required for 1-6 hours forecast it is necessary to review the nearest NWP output but also to consider an extrapolation based on surface observations (METAR, SYNOP reports), automatic observations; upper air data and satellite images. The lack of modern weather technology like radar, dense meteorological observations and lightning networks, and high resolution models is a minus. As can be thought the work of the meteorologist in such situation is very complex, therefore the experience of the forecaster is of great value. It has to be underlined that even in case of short time forecasting the lack of enough upper air data over the territory can lead meteorologists to false description of the current situation, what can be reflected in

false alarms. Having presented the situation in Colombia, local phenomena like flash floods are difficult to capture in terms of the initial time of occurrence with the actual level of technology. Therefore I am here to learn from the participants what could be the next steps in this area.
Talking about the media for dissemination of warnings let me say that radio is very developed. Equally, there are three TV private channels and one run by the government with national coverage and six private channels with regional coverage. The met service has access to one of the private channels in the morning hours to present a weather show and general warnings. Everyday many radio stations give credit to the weather forecasts

Finally, let me say that requirements to the met service from media, productive sectors and disaster management sector are each time more localized and specific. This is a challenge therefore to be visible we need to cooperate with more advanced met centers in exchanging not only information but know how.