

## **International Workshop on Tropical Cyclone Landfall Processes (IWTCLP-III)**

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### **A new operational convection-permitting NWP system for tropical cyclone forecasting in the SW Indian Ocean**

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The sub-division of Météo-France in La Réunion Island has been formally designated as Regional Specialized Meteorological Centre (RSMC) for the provision of forecasts and warnings of tropical cyclones (TC) in the south-west Indian Ocean (SWIO). Currently the French Weather Service provides forecast products from both global and regional numerical weather prediction (NWP) systems. The regional systems are based on the "ALADIN" model, which is a limited area model run with an 8-km horizontal resolution over 4 domains (French Caribbean's, SWIO, South Pacific and French Polynesia). Each system is operated with a 3D-Var data assimilation scheme, using additional pseudo-observations (wind bogus) and specific tunings for tropical cyclone initialization.

In order to address some limitations of current forecasting systems as well as to contribute to international ongoing efforts on TC intensity and landfall process prediction, Météo-France is currently developing a tropical version of its operational high resolution cloud resolving model "AROME", which is being used in mainland France for ~ 6 years. A major upgrade, planned for 2016, will consist in replacing all "ALADIN" systems by "AROME" configurations running at the horizontal resolution of 2.5 km. With this regard, a prototype version of this new NWP system, called "AROME-IO" (Indian Ocean), has been evaluated in the South-West Indian Ocean basin for about 6 months. The test configuration covers a single domain of ~ 3000 km x 1500 km over 90 vertical levels at the resolution of 2.5 km and is coupled with a 1-D mixed layer ocean model. It is equipped with a 3-D VAR assimilation scheme allowing to assimilate all sort of data including radar reflectivity and radial velocity observations – at the moment there is only a couple of operational Doppler radars available within the basin, both located at La Réunion, but new ones should be installed soon in Mauritius and Mayotte – and GPS observations, among others.

After a brief overview of the model specifications, this study will evaluate the benefit of using such high resolution model for predicting tropical cyclone landfall processes in the SWIO basin. Arome-IO forecasts of intense tropical cyclone Béchisa (04S), whose eye wall grazed La Réunion Island in early January 2014, will be evaluated against available observations and current operational model forecasts.