Tropical cyclones are tremendous natural hazards that threaten coastal populations worldwide. The purpose of this study is to perform data impact studies with the Aladin Reunion Limited Area Model, with a focus on the Indian Ocean area and a 3DVar data assimilation. Studies are performed for several storms of the 2006/2007 cyclonic season of the South West Indian Ocean basin. This last season proved to be very active with 10 named storms, 4 of which attained the major hurricane wind threshold of 50\,m/s. Satellite data has proven most invaluable when trying to initialize Numerical Weather Prediction (NWP) models since the oceanic zones over which the cyclones develop are, by nature, data sparse. Yet, the occurrence of clouds or rain proves to be a challenge when trying to assimilate satellite data: non linear processes dominate and the use of refined, costly numerical methods might be required. These computational costs are usually found to be prohibitive and cloudy/rainy data assimilation usually is a missing component in most operational centres. This proves to be of critical importance when dealing with tropical cyclones because their dynamics take place in the core, consistently missed by observations. Of the few centres that do not suffer from this crucial observational lack, the European Centre for Medium Range Weather Forecasting (ECMWF) has implemented a 1DVar inversion for cloudy/rainy areas which uses complex moist physical schemes to retrieve a Total Column Water Vapour (TCWV) equivalent from the rainy radiances, which is then used as pseudo-observation in the 4DVar assimilation. In order to alleviate the constraints posed by such a costly 1DVar inversion, we investigated an alternative to this approach. A statistical multi-linear regression that fits TCWV with the brightness temperatures of the SSM/I instrument in cloudy/rainy conditions is used, relying on the ECMWF analyses during a learning period. The convergence of the regression is investigated, and the tuning of the TCWV assimilation is performed. The resulting data are shown to be of good quality and to alter the hydrological cycle of the resulting analyses. The algorithm is then applied to combine clear-sky radiances with cloudy/rainy TCWV in the 3DVar data assimilation scheme. Impacts of further observations and pseudo-observations such as a 3D wind bogus and microwave SST are also conducted, both in terms of forecast impacts and of measures of data impact. High resolution forecasting nested from the 10km runs is also investigated in the AROME model.