**Hydro-meteorological aspects of Tropical Cyclone Phailin in Bay of Bengal in 2013**

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Tropical Cyclone Phailin is the second strongest tropical cyclone ever recorded in the Bay of Bengal after the Odisha super-cyclone of October, 1999. The Very Severe Cyclonic Storm, Phailin crossed Odisha & adjoining north Andhra Pradesh coast near Gopalpur (Odisha) around 2230 hrs IST of 12th October 2013 with a sustained maximum surface wind speed of 200-210 kmph gusting to 220 kmph. It caused very heavy to extremely heavy rainfall over Odisha leading to floods. Maximum rainfall was recorded over northeast sector of the system centre at the time of landfall. Maximum 24 hr cumulative rainfall of 380 mm was reported by an automatic raingauge in Banki (Cuttack district) of Odisha. The highest 24 hr cumulative average rainfall of 187 mm was recorded in Nayagarh district on 13 October (ending at 0830 Hrs IST on 13 October) and highest 48 hr cumulative rainfall of 232 mm was recorded in Mayurbhanj district on 14 October (ending at 0830 hrs IST of 14 October,2013).The daily Indian precipitation analysis formed from a merged data set of IMD rain-gauge data with the TRMM TMPA satellite-derived rainfall estimates showed Cyclone Phailin’s heaviest rainfall (>800 mm) occurred over open waters of east central Bay of Bengal. The merged data was used to create a map of rainfall generated by Cyclone Phailin as it progressed through Bay of Bengal (BoB) from 8 October to 12 October. Phailin gave maximum rainfall of around 800 mm in the Southwest sector of the track over east-central BoB near Andaman Islands, when it intensified from Deep depression into a cyclonic storm on 9 October, 2013. The districts in the northeast Odisha (Balasore, Bhadrak and Mayurbhanj) recorded as much as 300-400 mm and other parts of Odisha received between 200 to 300 mm as Phailin made landfall on the night of 12 October. The 24 hr rainfall forecast of HWRF during the Cyclone period were used to generate similar map and it was seen that the model overestimated as compared to the observed rainfall in sea area but underestimated the rainfall after landfall. In comparison with the observed rainfall the model forecast was on the higher side with an average error of more than 300 mm for the maximum rainfall. The model also could not capture the rainfall in the Northeast sector of the cyclone after crossing the coast.

Although the rainfall over Odisha was heavy to very heavy after landfall (2100 hrs IST) on 12 October but it reduced considerably by morning of 13 October as the heavy rainfall sector shifted to Bihar and Jharkhand (States to the north of Odisha). The rainfall and the storm surge of 2 m along the coast lead to flooding over coastal Odisha. The water could not recede back for a week, due to swollen sea and thus lead to damage of standing rice crop. Post-cyclone there was large scale flood in coastal districts of Odisha. This resulted in the extensive inundation of Rice fields. An attempt has been made to assess the impact of Phailin cyclone in coastal area of India especially Odisha’s coastal district . These districts were badly affected by cyclone and large scale rice area was submerged in water which led to socio-economic loss in state because rice is major crops in the state as well as main source of food. Satellite data based mapping of rice inundated area was carried using Microwave Remote Sensing data from RISAT-1 and Radarsat-2. Total ten districts were affected by flooding, out of which Baleshwar, Bhadrak, Jajpur and Kendrapara were worst affected.

Thus this study assessed all the hydrological aspects of Cyclone Phailin, including the rainfall pattern and flood impact on agriculture.