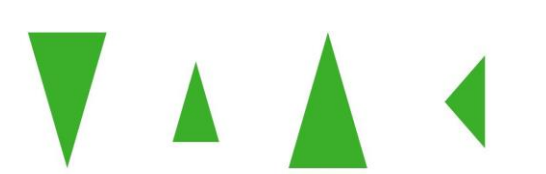




# IMPACTS OF CYCLONE INDUCED STORM SURGE IN THE COMBINED GBM DELTA

DECCMA



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## Abstract

A cyclone is a tropical storm or atmospheric turbulence involving circular motion of winds. GBM Delta of both Bangladesh and India is considered to be vulnerable due to tropical cyclones. Recent past cyclones 'SIDR' (November, 2007; landfall close to Sundarbans inside Bangladesh) and 'AILA' (May, 2009; landfall at west Bengal) caused severe damages in terms of property and life losses close to the landfall locations. SIDR was characterized by its strength and AILA was characterized by its after-effects. The storm surge inundations generated by both of these cyclones were influenced by its landfall locations. This study mainly focused on the actual inundation characteristics (surge depth and areal extent of flood), wind speed and thrust force of SIDR-AILA cyclones. To achieve the objectives, calibrated and validated Delft3D, DelftDashboard, flow model and distributive force model are applied in the combined GBM Basin. Results indicate noticeable differences in flooding patterns, thrust force and wind speed as these cyclones made landfall in different locations.

## Study Area

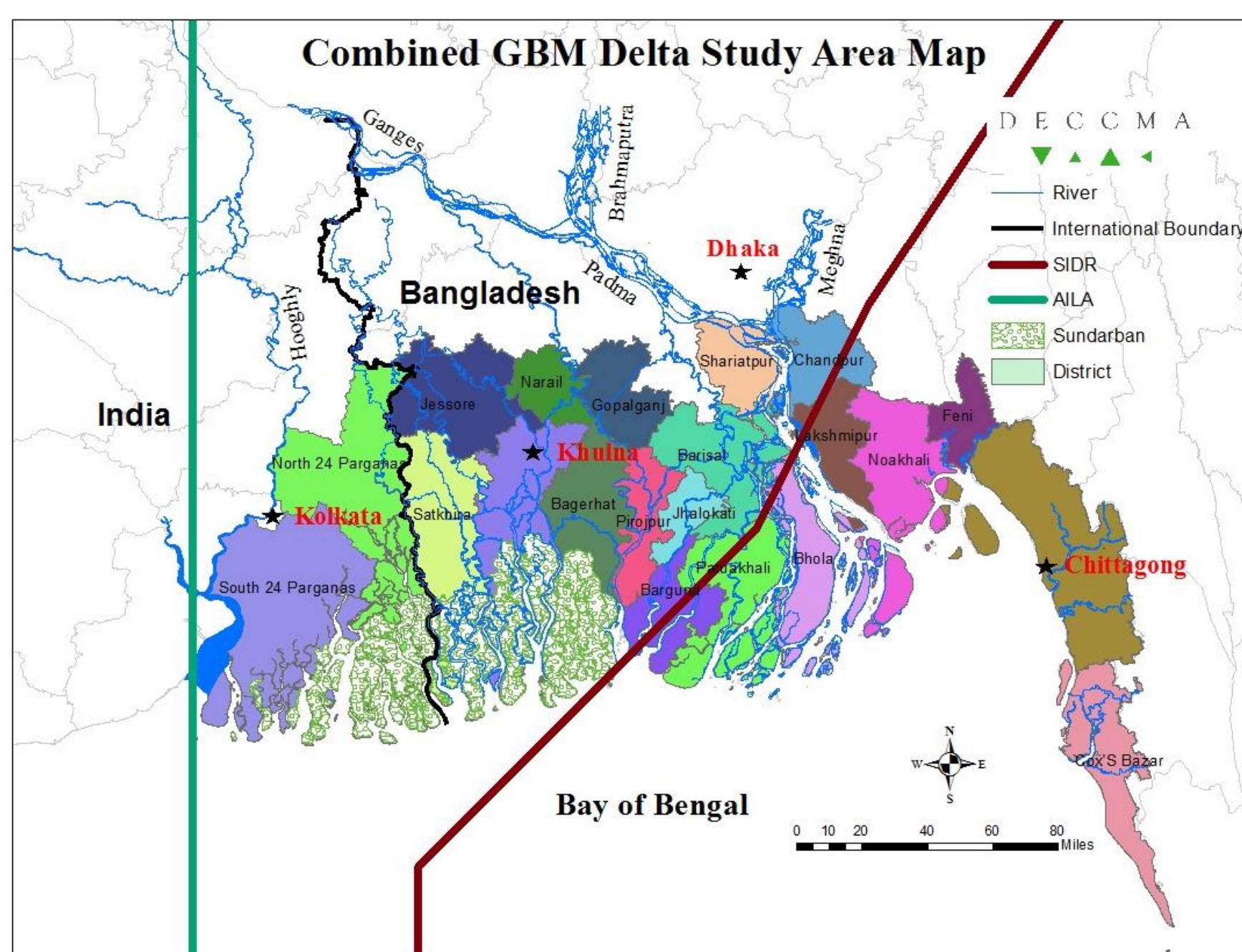


Figure 1: Study area map including cyclone tracks

## Inundation

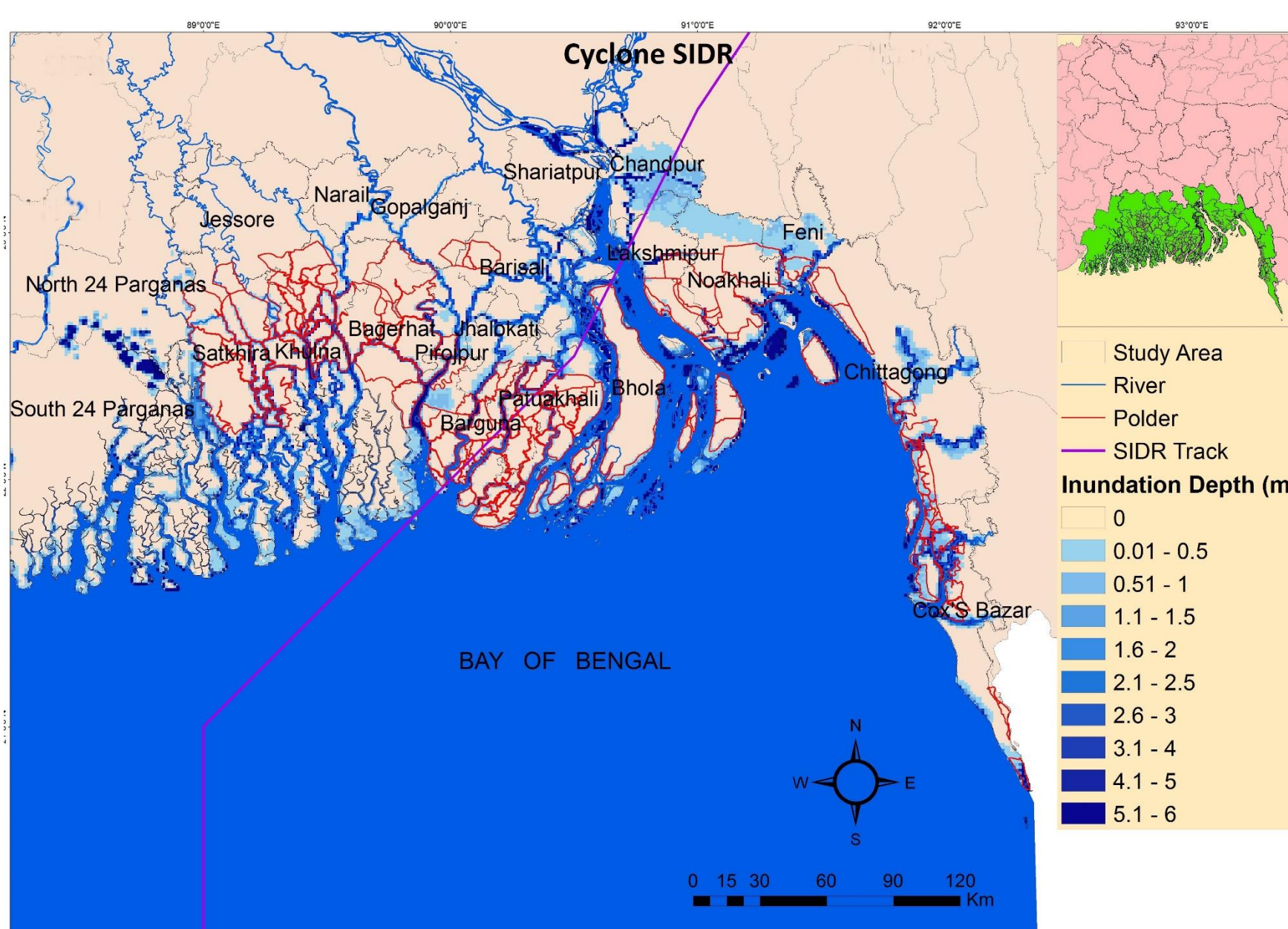


Figure 2: Inundation Depth (SIDR).

## Conclusions

Both of these cyclones draw considerable attention to the scientific communities, as these cyclones were believed to be the proxy-cyclones of climate-change-induced-phenomena. Central region and eastern region has been affected mainly due to SIDR whereas western region especially South 24 Pargana has experienced severe damage for AILA.

## Wind Field

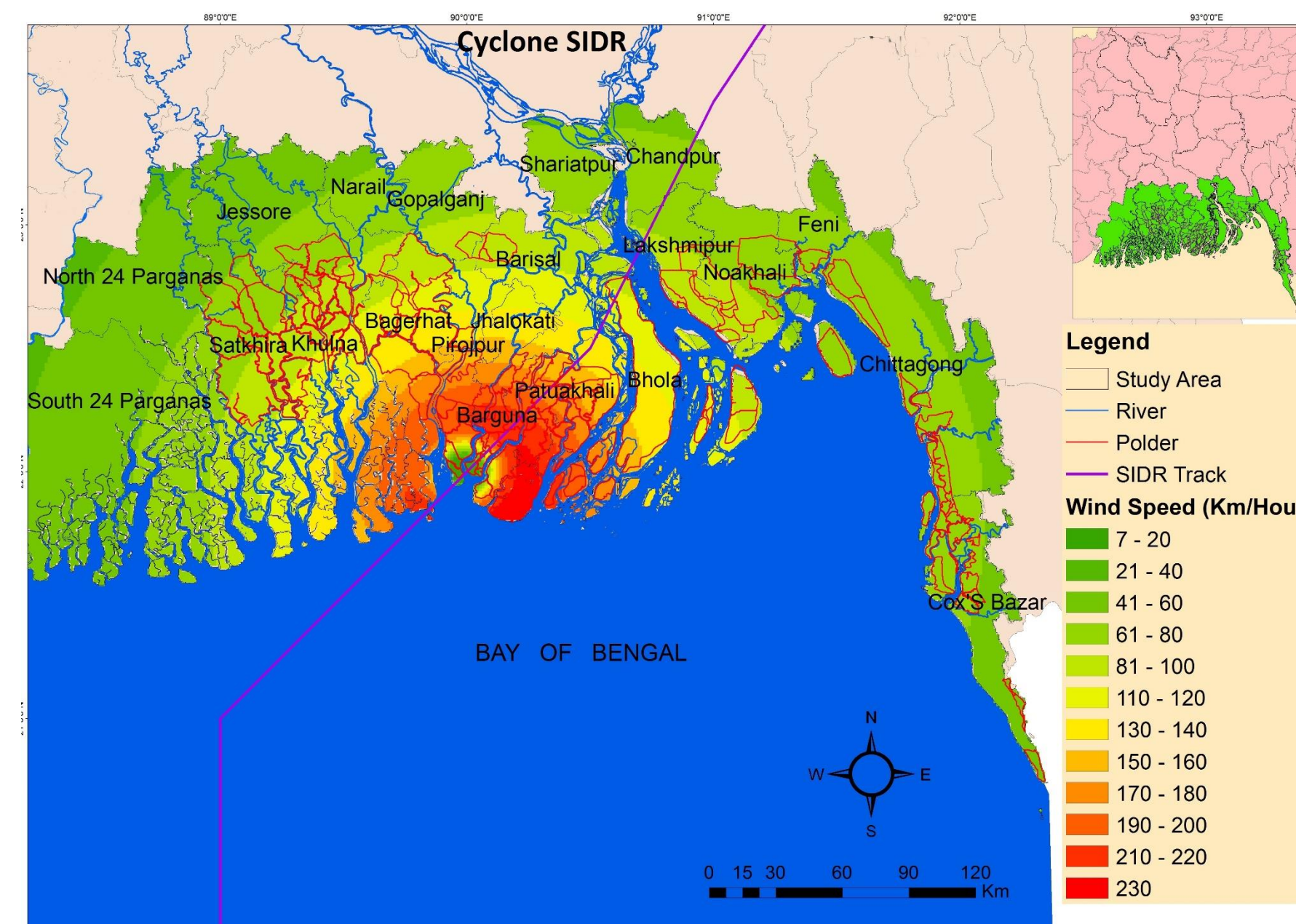


Figure 4: Wind Field of SIDR

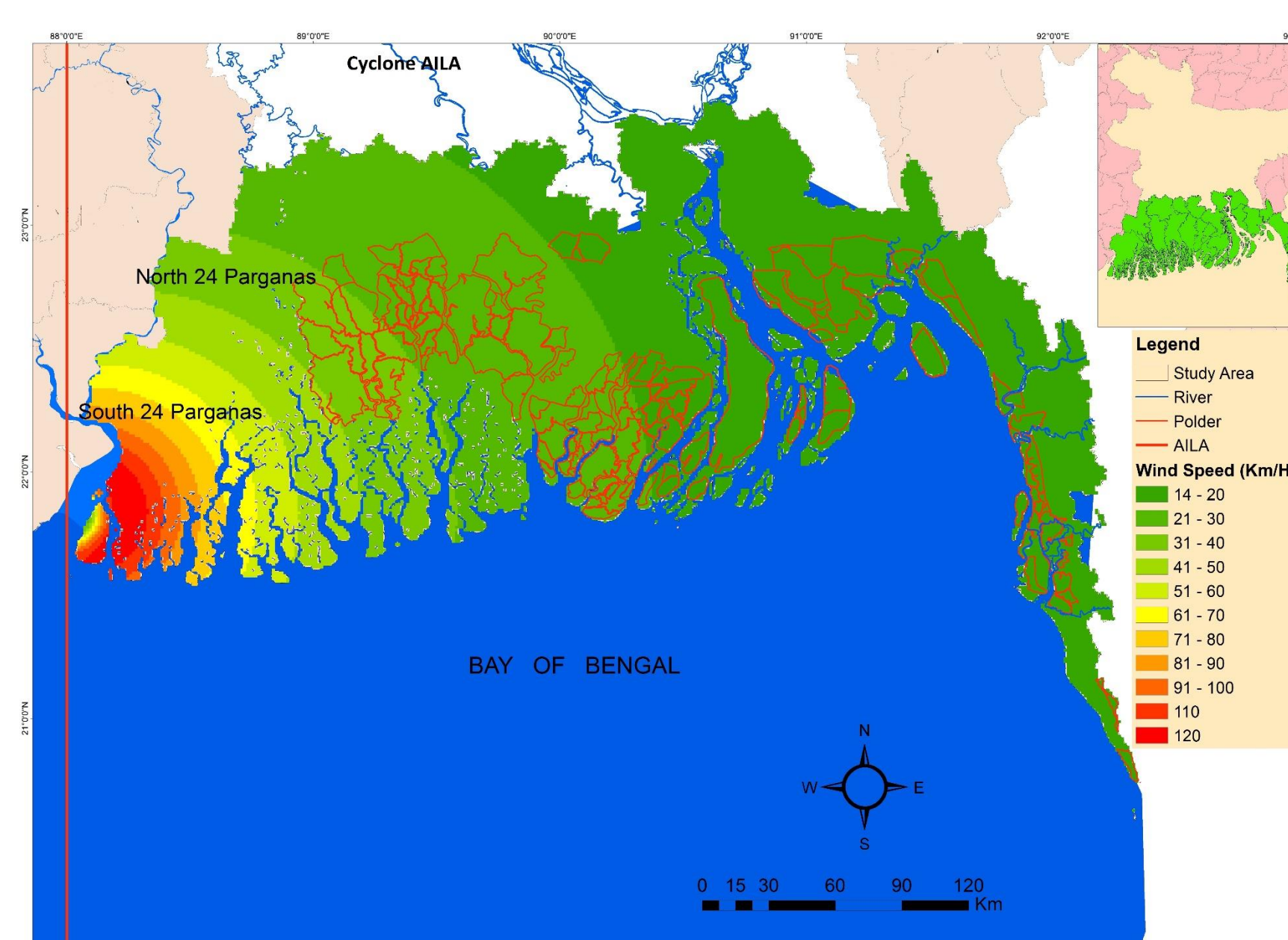


Figure 5: Wind Field of AILA

## Thrust Force

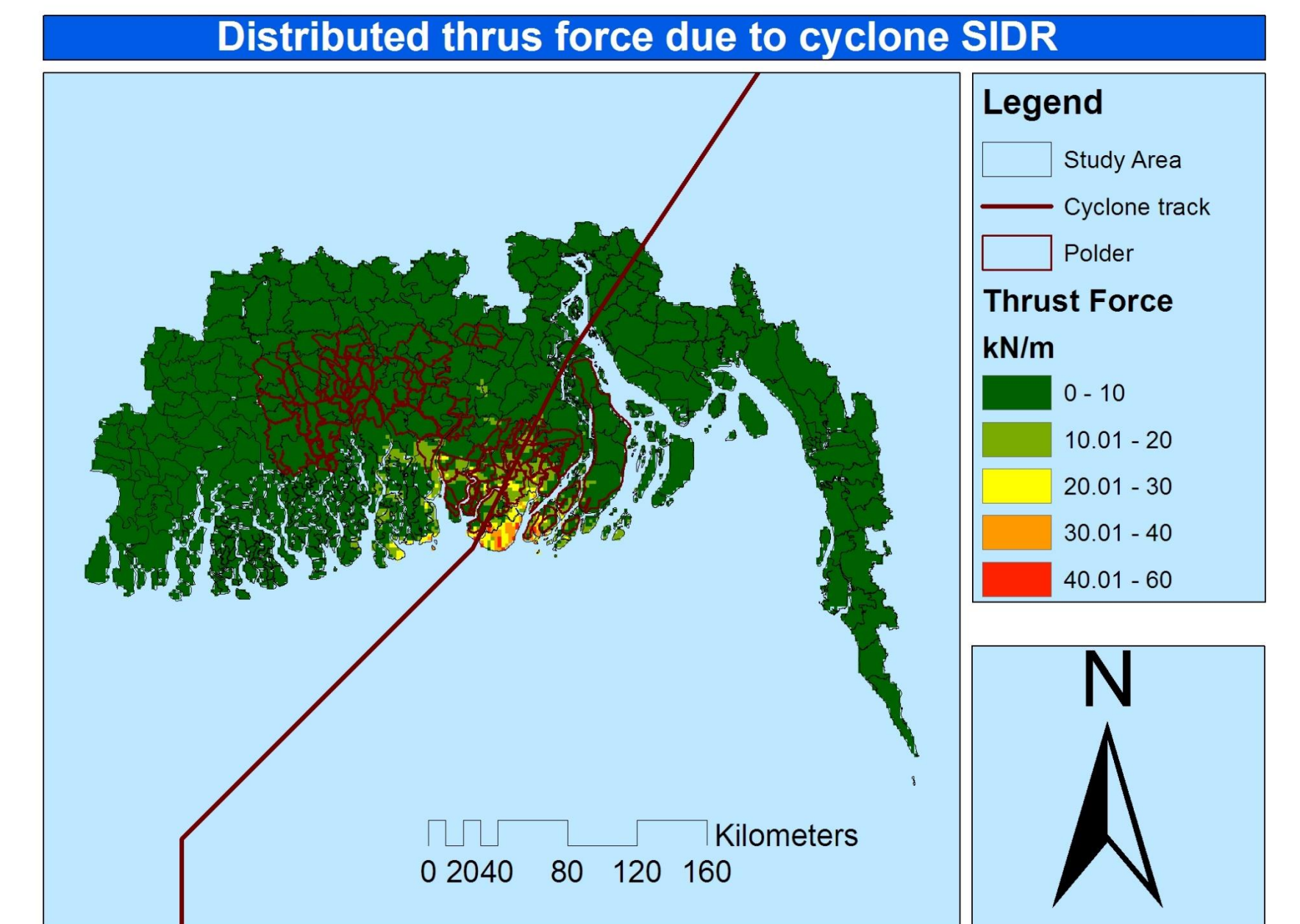


Figure 6: Thrust Force Map (SIDR)

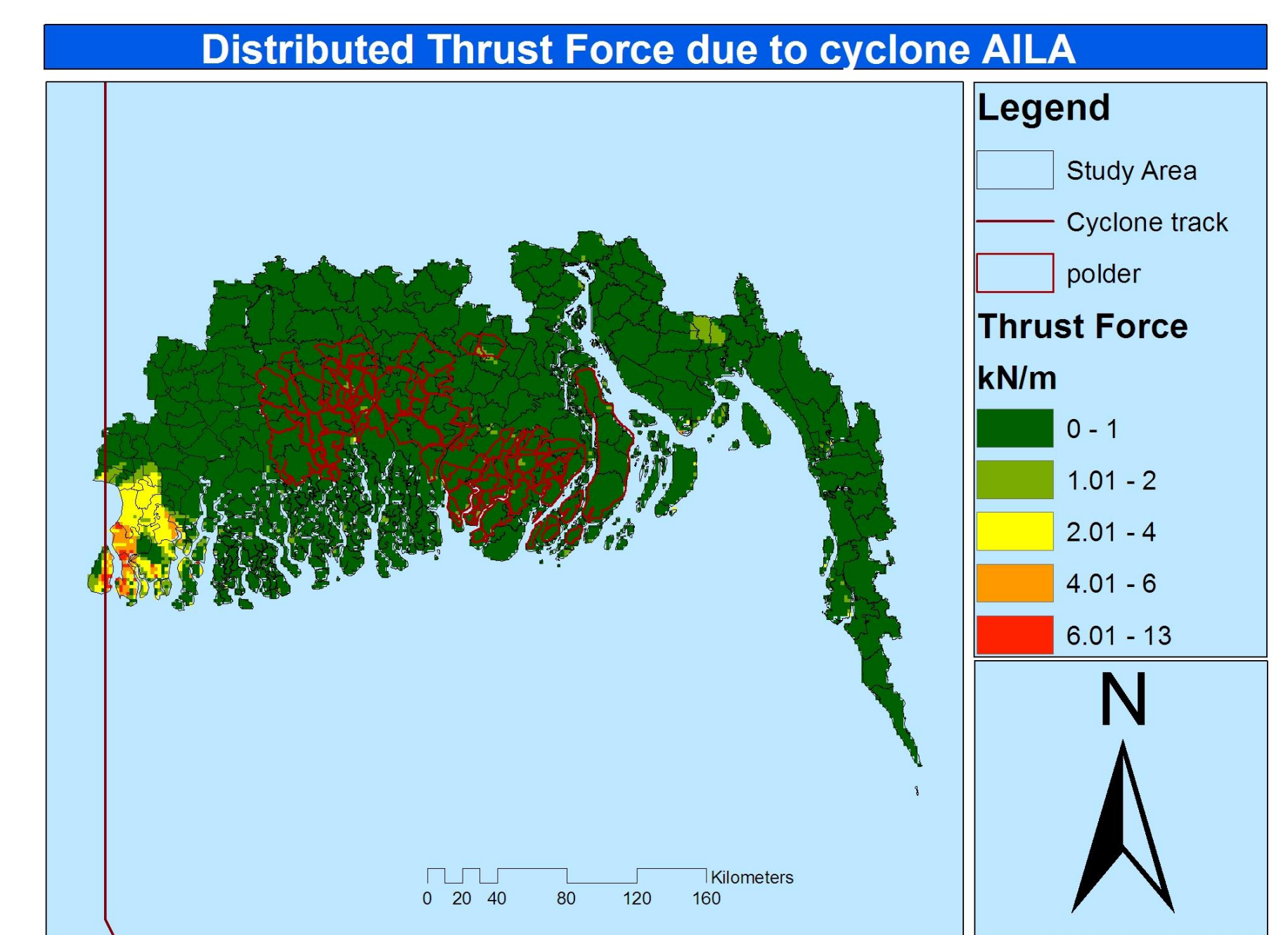


Figure 7: Thrust Force Map (AILA)

## Results

- ❖ Central region (Pirojpur, Barguna, Patuakhali) has been affected more due to cyclone SIDR. Maximum wind and thrust force is found around 220 km/hour and 60 kn/m respectively in that region.
- ❖ Maximum inundation has found in Eastern region (Barguna, Chandpur, Noakhali & Feni) for SIDR. Maximum inundation depth (5.60 meter) Is observed in Betagi, Barguna,.
- ❖ Western region (Combined Sundarban region) is mostly affected by cyclone AILA. Maximum wind speed, thrust force and inundation depth are found in South 24 Pargana which is around 120 km/hour, 13 kn/m and 2.5 meter respectively.

## Acknowledgment



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