

Impact Assessment of IOD/ENSO in the Asian Region

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The relationships between Indian Ocean Dipole (IOD) and El Nino Southern Oscillation (ENSO) have been studied extensively. IOD is normally characterized by anomalous cooling of Sea Surface Temperature (SST) in the south eastern equatorial Indian Ocean and anomalous warming of SST in the western equatorial Indian Ocean. ENSO is composed of an oceanic component, El Nino (La Nina) which is characterized by warming or cooling of surface waters in the tropical eastern Pacific Ocean, and an atmospheric component, the Southern Oscillation, which is characterized by changes in surface pressure in the tropical western Pacific. The two components are coupled: when the warm oceanic phase (El Nino) is in effect, surface pressures in the western Pacific are high, and when the cold phase is in effect (La Nina) surface pressures in the western Pacific are low. Both IOD and ENSO have been recognized as an important event of the tropical ocean-atmosphere-continent coupled system of the tropics. While the ENSO originates in the tropical Pacific Ocean and got worldwide attention because of its societal impacts, IOD originates in the tropical Indian Ocean didn't paid much attention because of the variability of climate and seasonal winds influence. A positive IOD event causes drought in Indonesia, more rainfall in India, Bangladesh and Vietnam and dry and hot summer in Japan, Korea, and Eastern part of China. A negative IOD events causes reverse of it. Many IOD events in the recent past occurred independently of the El Nino/La Nina. Even independent effects of IOD and ENSO have been established in the Asian region though both events occurred in the same year in few

occasions. Hence both have strong impacts on the climate of the Asian region. The impacts of natural disasters in recent past are in an increasing trend in the Asian region and particularly in the South Asian region. Due to predominantly developing in nature, highly vulnerable, poor quality of life and lack of advanced technological applications the Asian region is not adequately able to mitigate the natural disasters. The increase frequency of flood, drought and cyclones of various magnitudes affects this region adversely.

In this paper the IOD/ENSO impacts will be addressed from different view point like number of people killed, total affected and economic loss. For this I have collected 80-100 years of historical records of different types of disasters (Flood, Drought and Cyclone) in various Asian countries from different data sources. The data from the countries like Indonesia, Malaysia, Thailand, Japan, China, India, Bangladesh, Nepal etc. have been compared with the occurrence of IOD/ ENSO events year. With the use of Statistical analysis tools different diagrams and figures are made with relation to normal years and IOD/ENSO years. The result of this analysis shows that impact was severe during IOD/ENSO year than to normal years. Different impact assessments are also done independently for IOD and ENSO and clearly show distinct results with impact variability.