

Monitoring Cyclone “Akash” Using NOAA AVHRR Data

Satellite based monitoring of natural events in the country is an important area of activities of SPARRSO. In the recent time, SPARRSO has monitored and analyzed the cyclone “Akash” originated in the Bay of Bengal using time series NOAA AVHRR data. The data have been acquired at the satellite ground receiving station of the organization. The progressive development of the cyclonic situation and the associated radiative cloud characteristics have been studied as a function of time using time series NOAA AVHRR data supplemented with ground based meteorological information.

Analysis of time series data revealed that the cyclone crossed St. Martin's Island at about 21:37 BST on 14 May 2007 with a wind speed of about 150 km/hour. The cyclone turned into a depression on the following day and ultimately crossed the Bangladesh-Myanmar coastal region on the May 15. The track of the cyclone as derived from time series satellite images is also shown in figure. During the cyclone at least 30 chars under Kalapara, Galachipa and Dashmina upazilas in Patuakhali district were inundated under 5 feet to 7 feet of water. At least 40 fishermen were missing and 100 of Thatched houses were swept away from the offshore islands of St. Martin’s and Moheshkhali.

Development of a National Drought Monitoring System (NDMS) based on Remote Sensing and GIS Techniques

Drought is one of the important natural hazard events in Bangladesh that occurs very often specifically in certain areas of the country like Barind Tract. In this part of the country, seasonal drought occurs almost on a regular basis. Drought generally causes delay in agricultural crop cultivation with a subsequent reduction in crop production depending on the severity of drought intensity. In an over-populated country like Bangladesh where food-security is always a critical issue, early warning of drought and assessment of the current situation of drought are very important. Early warning helps the farmers and the agricultural managers to undertake necessary measures to cope with the forthcoming drought. On the other hand, the relevant policy makers can use the information on drought to undertake appropriate and timely actions for maintaining food-security in the country whenever drought prevails.

Remote sensing data is being used for monitoring drought by many countries, like India, China, U.S.A. etc. However, for application of the data in Bangladesh, some specific factors (environmental, geographical and topographical) are to be considered. SPARRSO has been carrying out research work

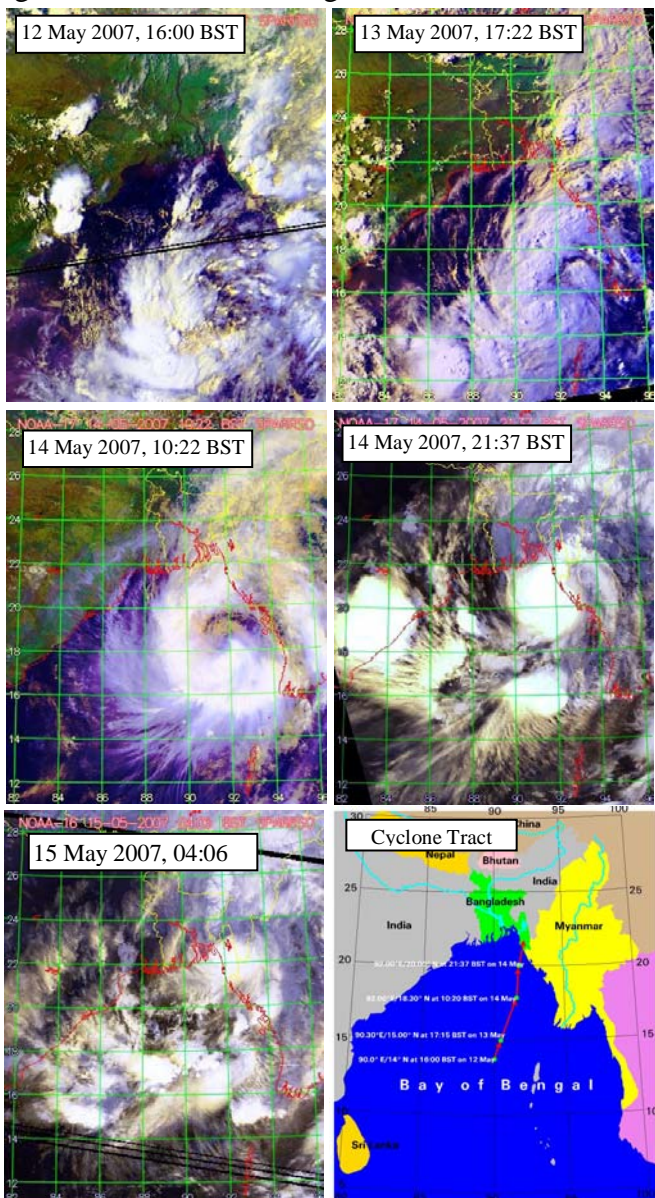


Fig. 1: NOAA AVHRR time series images showing sequential movement of the cyclone “Akash” and the track of the cyclone.

for development of a National Drought Monitoring System (NDMS) based on remote sensing, GIS and climate data. Early warning and evaluation of current drought intensity are the main objectives of this research work. Efforts are going-on to use remote sensing data for development of an appropriate drought index applicable in the context of Bangladesh. This drought index will be used as a basis for the NDMS.

Prawn, Fish and Paddy Culture in Shrimp Farms in South-western Bangladesh

The shrimp farming activities in the south-western coastal region of Bangladesh was investigated using remote sensing and GIS. The study has been conducted by a student of Fisheries Department, University of Dhaka as a partial requirement for the degree of M.S. under the supervision of a SPARRSO scientist. The information collected during the field data collection phase was used for the site suitability analysis using remote sensing and GIS.

A total of seven shrimp farms, located in Debhata Upazila of Satkhira district in the south-western Bangladesh were surveyed with a view to assess the practices of shrimp farming during the period November 2004 – January 2006. Information on physical properties, farming system, production, cost and price for different species in different shrimp farms were collected by semi-structured interview using questionnaires. Water salinity was found to increase gradually from November to May.

In the low-lying areas of the eastern side of the study area, shrimp, mainly *Penaeus monodon*, was cultured from February to July and prawn, mainly *Macrobrachium rosenbergii*, was cultured from April to November. Finfish, such as *Labeo rohita*, *Cirrhinus mrigala*, *Catla catla*, *Cyprinus carpio*, *Oreochromis niloticus* and *Ctenopharyngodon idella*, were cultured in the semi-saline water from July to December along with some estuarine species, such as *Lates calcarifer*, *Mugil parsia*, *Mystus cavasius*, *Oreochromis niloticus*, *Oreochromis mossambicus* and *Mugil corsula*. Production

rates in the farms of the eastern side were shrimp-182.95-kg/ha, prawn-28 kg/ha and finfish-228.45 kg/ha and that in the western side were shrimp-39.60 kg/ha, prawn-25.08 kg/ha, finfish-135.60 kg/ha. In the western side of the study area with lower water depth and salinity, paddy (BRRI-40 and BRRI-41) was also cultivated from August to January and production rates of paddy was 3500 kg/ha. In some of the shrimp farms, both in the eastern and in the western side, culture of *P. monodon* was affected by white spot disease resulting in very low production of shrimp. Farmers mitigated the loss by culturing prawn, finfish and paddy in the shrimp culture ponds. The farms in the eastern side were more profitable than those of the western side in terms of net economic return. The present study revealed that local level adaptations in shrimp farming techniques have been evolved with the experiences of the farmers.

Cold Wave Passed over Bangladesh: A Satellite Based Radiative Characterization

Fog is a natural weather phenomenon that usually occurs in Bangladesh during winter season. In general, the passage of cold wave over the country accompanies a significant drop down of overall temperature in the area with a presence of fog. Satellite platform provides a powerful means of monitoring such natural event by virtue of its large area coverage and synoptic viewing capability. One such event has been monitored by SPARRSO this year as one of its routine activities. Satellite images acquired in the visible and infrared region of the solar spectrum showed appreciable sensitivity to the presence, properties and spatial distribution of fog in the atmosphere. It is observed that such effect resulted in a dual impact on the digital satellite images with a systematic increase in data value in the visible region with an appreciable reduction of image contrast. While, a tendency of subsequent lowering of the radiance value in the thermal infrared region of the solar spectrum has been noticed.

During the period of cold wave, the observed temperature dropped down significantly throughout the country and the atmosphere remained foggy. The shape of the wave and its directional movement pattern were very much visible and well-defined in the satellite image and were monitored temporally. Analysis of time series data of NOAA AVHRR provided graphical information on the dynamic evolution of the situation. Satellite derived wave pattern coupled with in situ temperature measurements provided evidences on the possible temperature variability over the area and its underlying mechanism. Analysis of data provided an indication of the origin and aerial extent of the wave. The cold wave touched Bangladesh territory around December 30, 2006. The wave propagated through the north and north-western corner of the country and moved towards south-southeastern direction and ultimately it extended over the whole country, except Chittagong, Cox's Bazar, Bandarban, Rangamati, Khagrachari districts. The situation continued upto January 13, 2007.

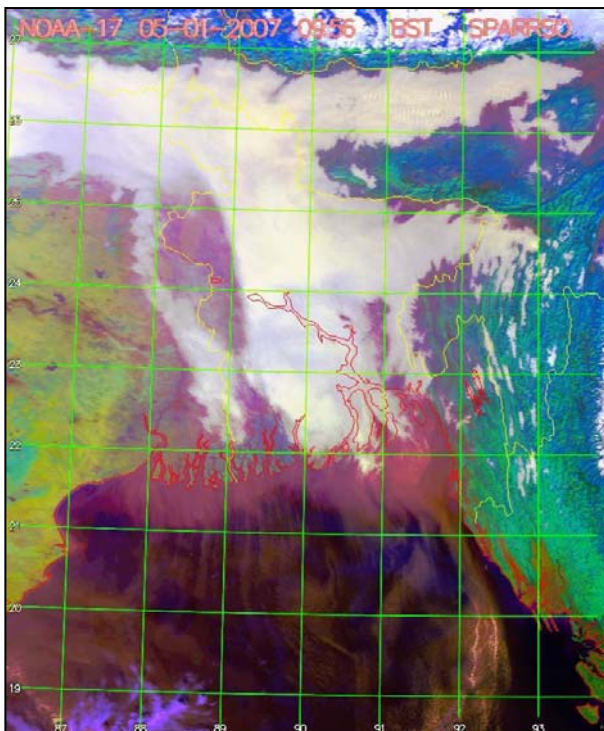


Fig. 2: NOAA AVHRR image product showing the aerial extent of cold wave in Bangladesh on the January 5, 2007 at 10.00 AM.

Development of a GIS Framework for Analysis of Flood Data

SPARRSO has a long experience of monitoring, mapping and analysis of flood in Bangladesh since 1984 and is perhaps a pioneer in the country in satellite based flood monitoring application. It processed and successfully utilized the NOAA AVHRR images for retrieving valuable information on nation-wide flood in 1988 and provided it to the relevant Government departments. It prepared flood maps and generated flood area statistics for the floods in 1998 and 2004 and supplied these information to the relevant Government departments and NGOs.

Recently, SPARRSO has undertaken an important research work to develop a nation-wide operational methodology using integrated remote sensing and GIS for addressing the phenomenon of flood and assessment of related risk issues in the country. The ultimate aim of these research works is to provide information on prevailing flood as much as possible. A basic part of the research works is to develop a GIS framework for analysis of flood relevant data so that during a flood event all relevant data can be analysed based on a pre-defined schedule. As a part of this research work, a GIS framework is being developed on pilot basis. The framework would be tested using the flood data of 1998 and 2004 before it be extended for the whole country.

Leave Preparatory to Retirement (LPR)

Mr. Abdul Halim Howlader, Chief Scientific Officer and Chairman (Acting) of SPARRSO, has gone on Leave Preparatory to Retirement (LPR) with effect from 27 February 2007. He started his career as an Assistant Instrumentation Engineer in the Dhaka University in 1976. He joined SPARRSO as Senior Scientific Officer in 1980. He acted as Chairman of SPARRSO since 31 October 2003.

Participation in Training/ Seminar/
Conference

Dr. M.A. Shahid, PSO, participated in the Consultation and Dissemination Workshop on “Baseline Study on Disaster Risk Management and Climate Change Impacts Knowledge and Understanding among CDMP Stakeholders”, organized by Bangladesh Centre for Advanced Studies (BCAS) and supported by Comprehensive Disaster Management Programme (CDMP) and Ministry of Food and Disaster Management (MoFDM), Dhaka on 11 January 2007.

Md. Atiar Rahman, PSO, participated in the “Expert Meeting on Reformation of Nomination Dossier Mohasthanhar and Its Environs, Bangladesh” – organized by Department of Archaeology, Ministry of Cultural Affairs, at Mohasthan Site Museum, Mohasthanharh, Bogra from 10-13 February 2007.

Md. Atiar Rahman, PSO, chaired a session of the orientation programme for the team members of the project “Study of Detailed Coastal Land Zoning including two Pilot District of Plain Land”. The theme of the session was “GIS and Remote Sensing Application in Land Zoning Provision and Methodology”. The programme organized by Ministry of Land at the project office, Gulshan-2, Dhaka on 05 March 2007.

Dr. M.A. Shahid, PSO, participated in the inception workshop on “Crop Insurance as a Risk Management Strategy in Bangladesh”, organized by Department of Environmental Studies, North South University under the support by UNDP and DFID, Dhaka on 22 March 2007.

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A group of scientists from SPARRSO participated in the seminar on the occasion of the ‘World Meteorological Day-2007’ organized by Bangladesh Meteorological Department (BMD), Dhaka on 23 March 2007.

Publication

Rahman, M.M. and Csaplovics, E. – “Examination of Image Fusion Using Synthetic Variable Ratio (SVR) Technique”, International Journal of Remote Sensing, Vol. 28, No. 15, 3413-3424.

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