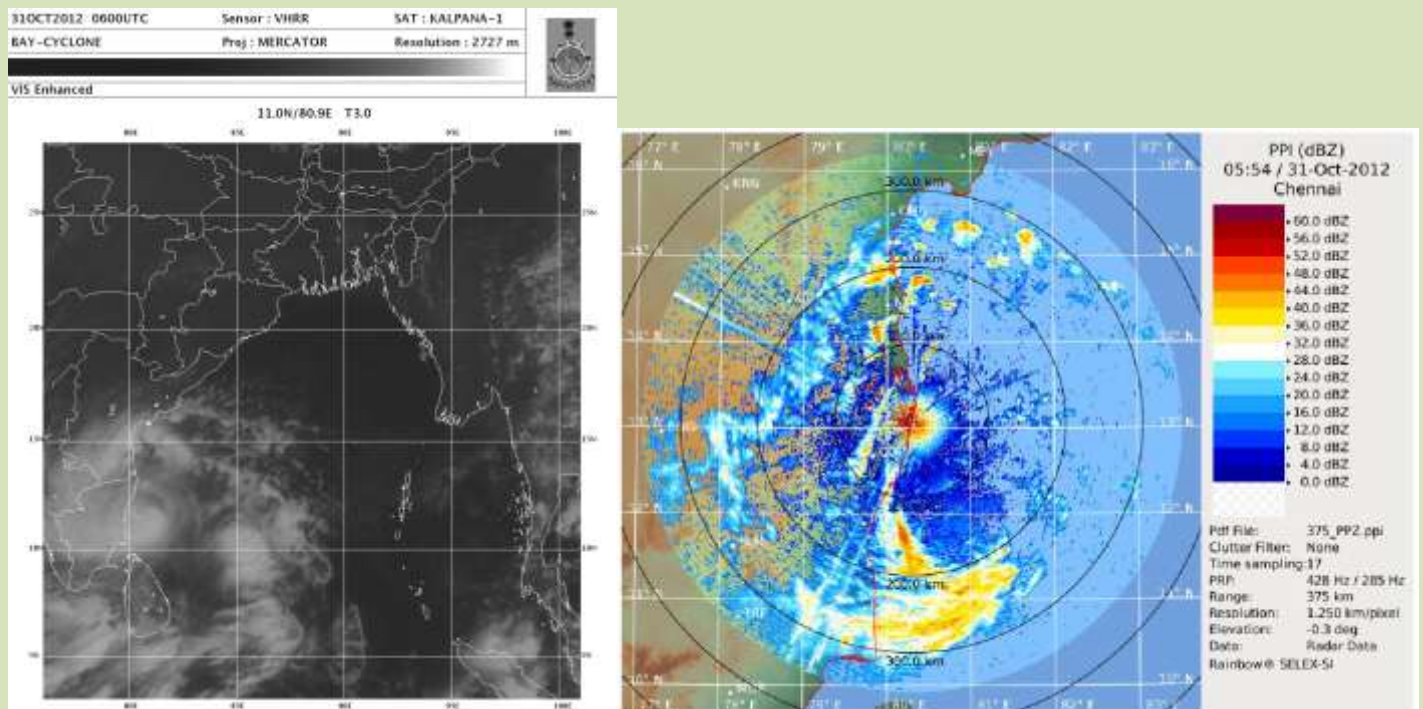




**GOVERNMENT OF INDIA**  
**MINISTRY OF EARTH SCIENCES**  
**INDIA METEOROLOGICAL DEPARTMENT**

**A Preliminary Report on Cyclonic storm, NILAM over Bay of Bengal  
(28 October- 01 November, 2012)**



**CYCLONE WARNING DIVISION, NEW DELHI**

**OCTOBER 2012**

## Cyclonic Storm, NILAM over Bay of Bengal (28 October- 01 November, 2012)

### 1. Introduction

A cyclonic storm, NILAM crossed Tamilnadu coast near Mahabalipuram (south of Chennai) in the evening of 31<sup>st</sup> October 2012 with a sustained maximum wind speed of 70-80 knots. The salient features of this storm are as follows.

- (i) It followed a unique track with many rapid changes in direction of movement. It initially moved westwards, remained practically stationary for quite some time near Sri Lanka coast and then moved north-northwestwards till landfall. It moved west-northwestwards initially over land upto south interior Karnataka and then moved northwest and northwards. The remnant low pressure area moved northeastwards
- (ii) It moved very faster on the day of landfall, i.e. 31<sup>st</sup> October 2012.
- (iii) Over the land surface, the cloud mass was significantly sheared to the northeast of system centre during its dissipation stage leading to rainfall activity over entire Andhra Pradesh and adjoining Odisha
- (iv) Maximum rainfall occurred over southwest sector of the system centre and heavy to very heavy rainfall extended upto 300 km.

### 2. Brief life history

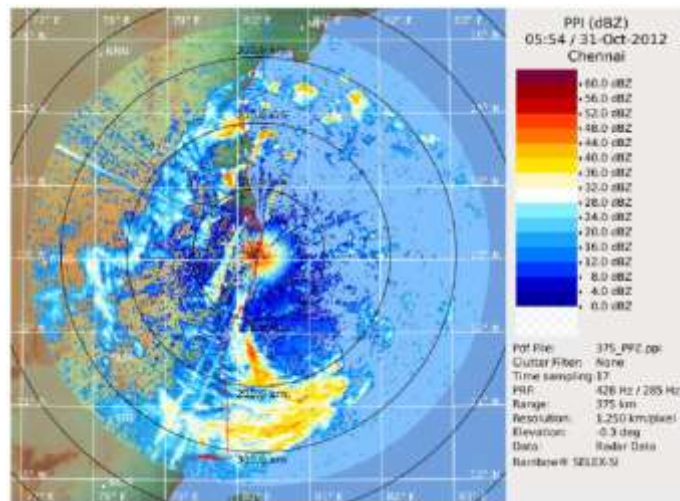
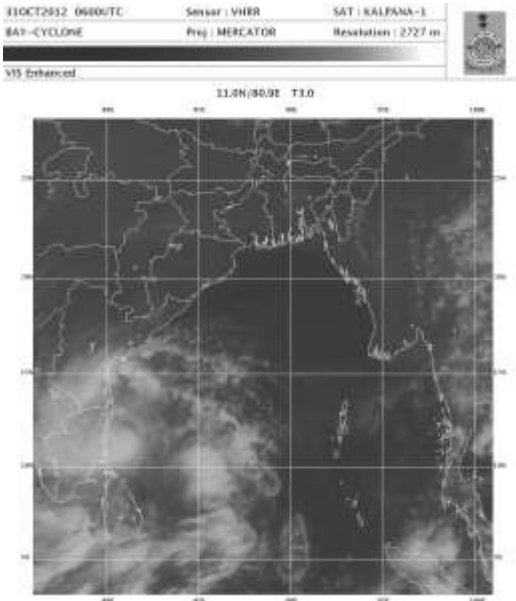
A depression formed over southeast and adjoining southwest Bay of Bengal at 1130 hrs IST of 28<sup>th</sup> October 2012 near latitude 9.5<sup>o</sup>N and longitude 86.0<sup>o</sup>E. It moved westwards and intensified into a deep depression in the morning of 29<sup>th</sup> October over southwest Bay of Bengal near latitude 9.0<sup>o</sup>N and longitude 83.0<sup>o</sup>E, about 550 km South-Southeast of Chennai. It continued to move westwards and intensified into a Cyclonic Storm, **NILAM** in the morning of 30<sup>th</sup> October over southwest Bay of Bengal off Sri Lanka coast. The Cyclonic Storm, **NILAM** then moved north-northwestwards, crossed north Tamilnadu coast near Mahabalipuram, south of Chennai between 1600 and 1700 hrs IST of 31<sup>st</sup> October 2012. After the landfall the cyclonic storm, Nilam moved west-northwestwards and weakened gradually into a deep depression and then into a depression over south Interior Karnataka in the morning of 01<sup>st</sup> November 2012. The typical satellite and radar imageries are shown in Fig.1. The track of the system is shown in Fig. 2. The best track parameters are shown in Table 1.

**Table 1: Best track positions and other parameters of the Cyclone 'Nilam' over the Bay of Bengal during 28 October-01 November, 2012**

Date	Time (UTC)	Centre lat. <sup>o</sup> N/ long. <sup>o</sup> E	C.I. NO.	Estimated Central Pressure (hPa)	Estimated Maximum Sustained Surface Wind (kt)	Estimated Pressure drop at the Centre (hPa)	Grade
28-10-2012	0600	9.5/86.0	1.5	1004	25	2	D
	1200	9.5/85.0	1.5	1003	25	3	D
	1800	9.5/84.5	1.5	1002	25	4	D
29-10-2012	0000	9.5/84.0	2.0	1000	30	4	DD
	0300	9.5/83.5	2.0	1000	30	4	DD
	0600	9.0/83.0	2.0	1000	30	4	DD
	1200	9.0/82.5	2.0	1000	30	4	DD
	1800	9.0/82.0	2.0	1000	30	4	DD

30-10-2012	0000	9.0/82.0	2.0	999	30	4	DD
	0300	9.0/81.9	2.5	998	35	6	CS
	0600	9.0/81.8	2.5	996	35	6	CS
	0900	9.5/82.0	2.5	996	35	6	CS
	1200	9.5/81.8	2.5	994	40	8	CS
	1500	9.5/82.0	2.5	994	40	8	CS
	1800	10.0/82.0	2.5	992	40	8	CS
	2100	10.0/82.0	2.5	992	40	8	CS
31-10-2012	0000	10.5/81.5	3.0	990	45	10	CS
	0300	11.0/81.0	3.0	990	45	10	CS
	0600	11.5/81.0	3.0	990	45	10	CS
	0900	12.3/80.5	3.0	990	45	10	CS
	The system crossed north Tamilnadu coast near Mahabalipuram, south of Chennai (near latitude 12.6°N and longitude 80.2°E) between 1600 and 1700 hrs IST						
	1200	12.7/79.8		991	35	8	CS
	1500	13.0/79.5		996	35	6	CS
01-11-2012	1800	13.0/78.5		998	30	4	DD
	0000	13.0/77.5		999	20	3	D
	0300	13.5/77.0		1002	20	3	D
	0600	13.5/77.0		1002	20	3	D
	1200	14.0/77.0		1002	20	3	D
	1800	14.5/77.0		1004	20	3	D
02-11-2012	0000	Weakened into a well marked low pressure area over Rayalaseema and neighbourhood					

D : Depression, DD : Deep Depression, CS : Cyclonic storm



**Fig.1. Typical Kalpana-1 Satellite and DWR, Chennai imageries of cyclonic storm NILAM at 0600 UTC of 31 Oct. 2012.**



Tiruvarur Dist), Marakkanam and Vanur (both Villupuram Dist), Chengalpattu (Kancheepuram Dist), Cholavaram (Tiruvallur Dist), Puducherry (Puducherry Dist) and DGP office (Chennai Dist) 7 each,

**ANDHRA PRADESH:**

Srikalahasthi (dist Chittoor) 11, Tirumalla(a) (dist Chittoor) 8, Chittoor (dist Chittoor) 7,

**01. 11. 2012**

**TAMIL NADU AND PUDUCHERRY**

Yercaud (Salem Dist) 24, Alangayam (Vellore Dist) 20, Vandavasi (Tiruvannamalai Dist) 19, Tirukoilur (Villupuram Dist) 14, Vanur and Tindivanam (both Villupuram Dist) 13 each, Gingee, Villupuram and Mylam AWS (all Villupuram Dist), Ambur and Tirupattur (both Vellore Dist) and Valangaiman (Tiruvarur Dist) 11 each, Sirkali (Nagapattinam Dist), Kodavasal (Tiruvarur Dist), Polur (Tiruvannamalai Dist), Sethiathope and Tozhudur (both Cuddalore Dist), Thali (Krishnagiri Dist), Melalathur (Vellore Dist) and Naduvattam (Nilgiris Dist) 10 each, Parangipettai (Cuddalore Dist), Trangambadi and Kollidam (both Nagapattinam Dist), Penucondapuram (Krishnagiri Dist), Needamangalam (Tiruvarur Dist) and Arani (Tiruvannamalai Dist) 9 each, Chengam and Tiruvannamalai (both Tiruvannamalai Dist), Mayiladuthurai (Nagapattinam Dist), Mannargudi (Tiruvarur Dist), Colachel (Kanyakumari Dist), Chidambaram and Cuddalore (both Cuddalore Dist), Pallipattu (Tiruvallur Dist) and Tirukattupalli (Thanjavur Dist) 8 each, Aravakurichi (Karur Dist), Barur, Hosur, Denkanikottai, Krishnagiri, Uthangarai and Pochampalli (all Krishnagiri Dist), Kattumannarkoil, Chidambaram AWS and Neyveli AWS (all Cuddalore Dist), Thanjavur, Thiruvaidaimaruthur, Kumbakonam, Madukkur, Vallam, Aduthurai AWS and Grand anaicut (all Thanjavur Dist), Sankarapuram (Villupuram Dist), Nannilam and Thiruthuraipoondi (both Tiruvarur Dist), Vaniyambadi (Vellore Dist), Puducherry (Puducherry Dist), Pappireddipatti and Dharamapuri (both Dharamapuri Dist), Thuvakudi and Pullambadi (both Trichy Dist), Eraniel (Kanyakumari Dist) and Kothagiri (Nilgiris Dist) 7 each,

**ANDHRA PRADESH:**

Vinjamur (dist Nellore) 16, Tirumalla(a) (dist Chittoor) and Ongole (dist Prakasam) 15 each , Darsi (dist Prakasam) 14, Addanki, Darsi(a) (and Cumbam (all dist Prakasam) and Kavali (dist Nellore) 13 each, Rapur (dist Nellore) , Bhimuniapatnam (dist Vishakhapatnam) and Podili (dist Prakasam) 12 each, Venkatagirikota (dist Chittoor), Kavali(a) and Venkatagiri Town (both dist Nellore) 11 each, Udayagiri (dist Nellore) and Avanigadda (dist Krishna) 10 each, Rajampet (dist Cuddapah) and Chittoor (dist Chittoor) 9 each, Thambalapalli and Arogyavaram (both dist Chittoor), Madakasira (dist Anantapur), Atmakur, Gudur and Nellore (all dist Nellore) 8 each, Srikalahasthi, Punganur and Puttur (all dist Chittoor), Amarapuram, Penukonda and Kadiri (all dist Anantapur), Seetharampuram (dist Nellore) and Kakinada (dist East Godavari) 7 each,

**KARNATAKA:**

Bagepalli (Chikaballapura dt) 14, Koratagere (Tumkur dt) 11, Kolar, Rayalpadu (Kolar dt), GKVK (Bengaluru Urban dt), Hoskote (Bengaluru Rural dt) 10 each, Srinivaspura (Kolar dt), Doddaballapura (Bengaluru Rural dt), Nayakanahatti (Chitradurga dt), CN Halli, Madhugiri (Tumkur dt), Thondebhavi, Gudibande (both Chikaballapura dt) 9 each, MM Hills (Chamarajanagar dt), Mulbagal, Bangarpet (both Kolar dt), Bengaluru City, Bengaluru HAL AP, Nelamangala (Bengaluru Rural dt), Hiriyur (Chitradurga dt), Kibbanahalli, Kunigal, Bargur (all Tumkur dt), Chintamani, Gowribidanur (both Chikaballapura dt) 8 each, Panchanahalli, Kadur (both Chikmagalur dt), Arasikere (Hassan dt), Bandipura (Chamarajanagar dt), Maddur (Mandya dt), Malur (Kolar dt), TG Halli (Bengaluru Urban dt), Devanahalli (Bengaluru Rural dt),

Jagalur (Davangere dt), Hosanagara (Chitradurga dt), Chitradurga, Gubbi, Sira (both Tumkur dt), Sidlaghatta (Chikaballapura dt), Magadi, Channapatna, Kanakapura (all Ramanagara dt), Ramanagara 7 each,

#### **4. Monitoring and Prediction**

The cyclonic storm NILAM was monitored mainly with satellite supported by meteorological buoys coastal and island observations. It was monitored by Doppler Weather Radar (DWR), Chennai from the night of 29<sup>th</sup> October, when the cyclonic storm was at about 500 km southeast of Chennai. While coastal surface observations were taken on hourly basis, the half hourly INSAT/ Kalpana imageries and every 10 minutes DWR imageries and products were used for monitoring of cyclonic storm.

Various numerical weather prediction (NWP) models and dynamical-statistical models including IMD's global and meso-scale models were utilized to predict the track and intensity of the storm. Recently installed Tropical Cyclone Module in the digitized forecasting system of IMD was utilized for analysis and comparison of various NWP models and decision making process.

#### **5. Forecast Performance**

##### **(i) Warning services**

The numbered warning bulletins were issued by Cyclone Warning division, IMD, New Delhi since 28<sup>th</sup> October 2012 noon. The bulletins were issued every three hourly since the cyclonic storm stage, i.e. from 30<sup>th</sup> October 2012 morning. As a whole, 25 warning bulletins were issued to various disaster management agencies in the national level and to Govt. of Tamil Nadu, Puducherry and Andhra Pradesh through various channels including e-mail, fax, SMS and personal briefing. The Area Cyclone Warning Centre at IMD, Chennai and Cyclone Warning Centre at Visakhapatnam issued user specific bulletins and briefings for fishermen, ports, ships, state disaster management agencies, media, Indian Navy, aviation authorities etc.

A press conference was also held on 30<sup>th</sup> October afternoon at IMD New Delhi to brief about the current status and forecast on cyclonic storm, NILAM.

##### **(ii) Forecast verification**

Seventy two hours in advance of landfall, when the system was a depression located at 650 km southeast of Chennai, it was predicted that the system would intensify into a cyclonic storm and move towards north Sri Lanka and Tamil Nadu coast. The average track forecast error is shown in Table 1. It was 114 km, 176 km and 236 km respectively for 24, 48 and 72 hrs forecast period. This error is significantly less than the average forecast errors in last five years. Considering the landfall forecast error, the landfall near Chennai was predicted well in advance (before 60 hrs). The landfall point forecast errors are about 11 and 45 km and landfall time forecast errors are 2 and 1 hr for 24 and 48 hr forecasts respectively (Table 2), which is significantly less than the long period average. Considering the intensity forecast error, the realized wind speed at the time of landfall was about 70-80 kmph as recorded by meteorological observatories against the forecast of 80-90 kmph gusting to 100 kmph.

**Table 1 Average Track Forecast Error of Cyclonic Storm, Nilam**

<b>Lead Period (hr)</b>	<b>Error (km)</b>
12	70
24	114
36	145
48	176
60	172
72	236

**Table 2 Landfall Forecast Error of Cyclonic Storm, Nilam**

<b>Lead Period (hrs) of forecast from the time of landfall</b>	<b>Landfall Point Forecast Error (km)</b>	<b>Landfall Time Forecast Error (hr)</b>
<b>12</b>	<b>16</b>	<b>1.5</b>
<b>24</b>	<b>11</b>	<b>2.0</b>
<b>36</b>	<b>74</b>	<b>3.0</b>
<b>48</b>	<b>45</b>	<b>1.0</b>
<b>60</b>	<b>11</b>	<b>3.0</b>
<b>72</b>	<b>It was predicted that the system would move towards north Srilanka and Tamil Nadu Coast.</b>	