

“NORTHEAST MONSOON(OND) REPORT- 2014 BASED ON FEW GLOBAL OCEANIC &ATMOSPHERIC FACTORS”

INTRODUCTION:

The period October to December is referred to as Northeast Monsoon season over peninsular India. this period also referred to as "Post-Monsoon Season" or "Retreating southwest Monsoon Season".

Northeast Monsoon season is the major period of rainfall activity over south peninsula, particularly in the eastern half comprising of the meteorological subdivisions of Coastal Andhra Pradesh, Rayalaseema and Tamilnadu-Pondicherry. For Tamilnadu this is the main rainy season accounting for about 48% of the annual rainfall. Coastal districts of the State get nearly 60% of the annual rainfall and the interior districts get about 40-50% of the annual rainfall.

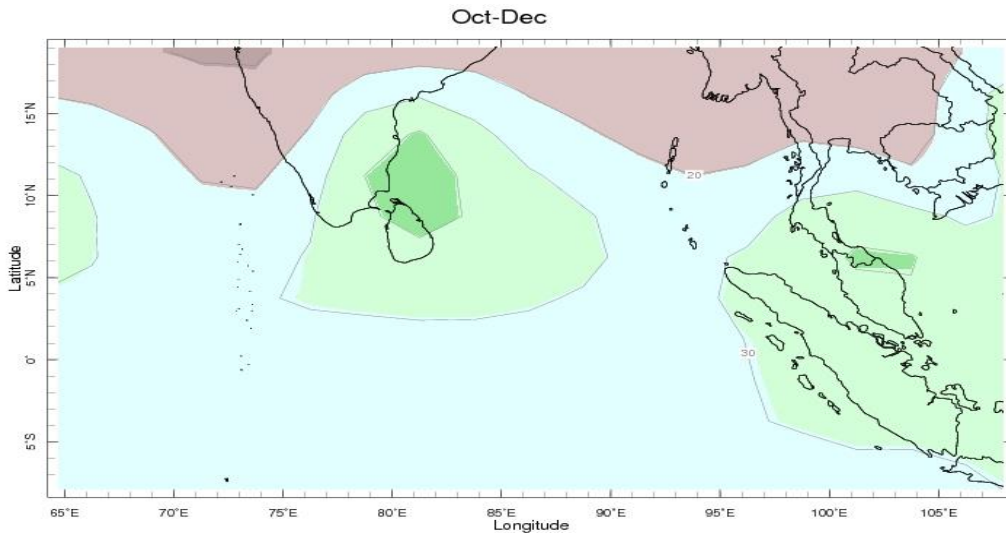
Though the principal rainy season for Interior Karnataka, Kerala and Lakshadweep is the Southwest Monsoon season, rainfall continues till December in these sub-divisions, the period October-December (Northeast Monsoon) contributing about 20 % of the annual total.

The increase in rainfall activity over Andhra-Tamilnadu coasts which takes place sometime around middle of October is generally considered as the "setting in of Northeast Monsoon". Normal date of onset of the northeast monsoon is around 20th October with a deviation of about a week on either side.

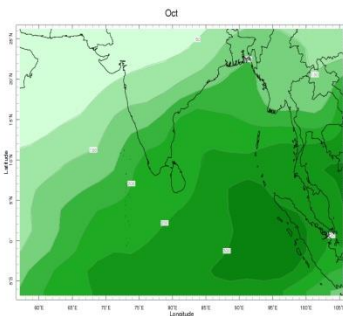
The rainfall over south peninsula towards the end of southwest monsoon season is mainly in the interior districts and it generally occurs in the afternoon , evening or early part of the night. As the season advances the rainfall is mainly in the coastal districts with the interior districts getting less rain. It generally occurs during night and early morning hours . Maximum rainfall mostly occurs between 2100 and 0300 hrs IST. Along the east coast rainfall during late night and morning hours (2400 to 0900 hrs) is an usual feature of northeast monsoon. When there is a low, depression or cyclone close by the rainfall occurs throughout the day.

Northeast monsoon rains occur in spells of about 3 to 4 days duration. Spells exceeding 4 days are much less (20%). There are at times long spells of dry weather with little or no rain.

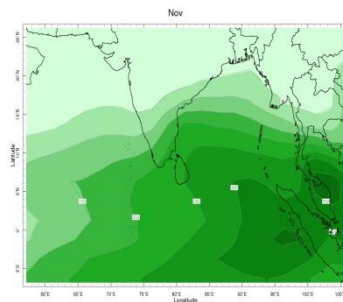
COURTESY-IMD CHENNAI



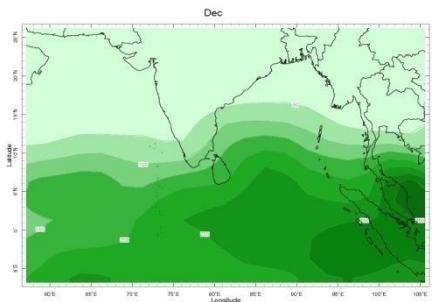
A) climatological precipitation of oct, nov, dec



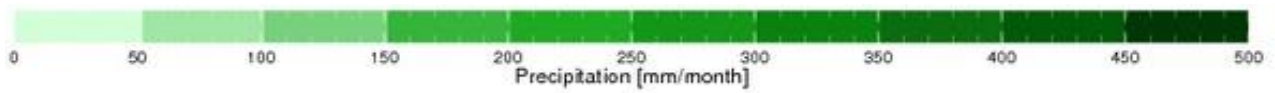
b) oct



c) nov



d) dec



POST MONSOON SEASON CYCLONES-2014

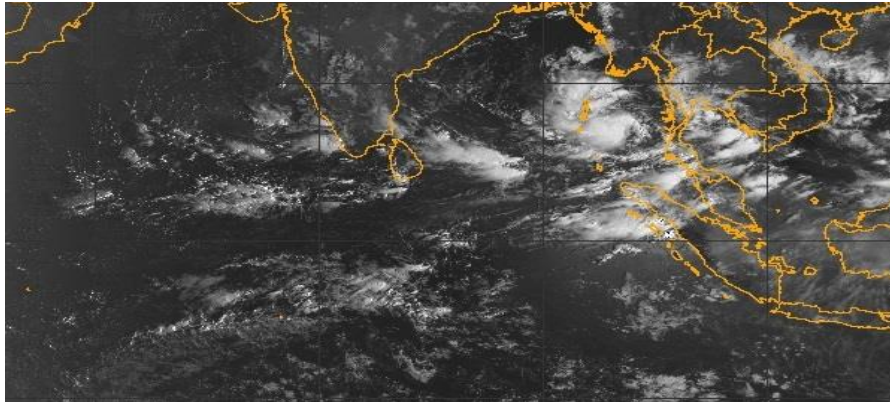
TOTAL NUMBER OF CYCLONES FORMED DURING POST MONSOON SEASON – 2(BELOW AVERAGE)

ONE SURFACED IN BAY OF BENGAL(DURING TRANSITION PHASE) AND THE OTHER ONE FORMED IN ARABIAN SEA DURING LATE OCT. "HUDHUD" AND "NILOFER" BOTH CATEGORISED AS VSCS(IMD INTENSITY SCALE) BUT INFAC T VSCS NILOFER WAS 5 KNOTS STRONGER THAN HUDHUD AS PER IMD OBSERVATION.

SALIENT FEATURES OF VSCS HUDHUD:

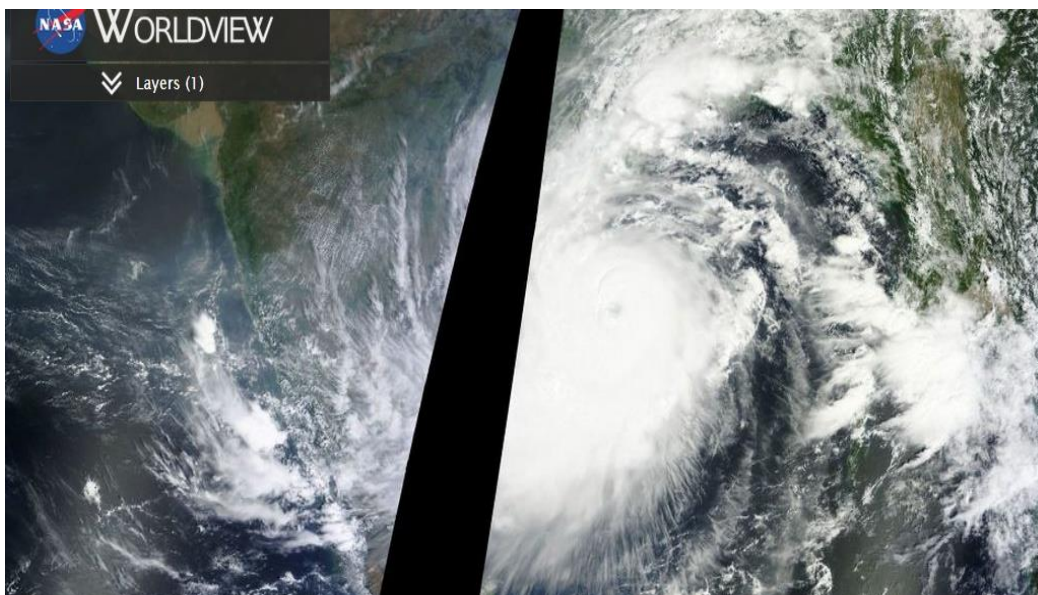
- i. HUDHUD is the first cyclone that crossed Visakhapatnam coast in the month of Oct., after 1985 and it made landfall on the same day as VSCS Phailin did in 2013.
- ii. At the time of landfall on 12th Oct, the estimated maximum sustained surface wind speed in association with the cyclone was about 100 Knots.
- iii. The estimated central pressure was 950 hPa with a pressure drop of 54 hPa at the centre compared to surroundings.
- iv. It caused very heavy to extremely heavy rainfall over North Andhra Pradesh and South Odisha and strong gale winds leading to large scale structural damage over North Andhra Pradesh and adjoining districts of South Odisha and storm surge over North Andhra Pradesh.coast
- v. Maximum 24 hour cumulative rainfall of 38 cm ending at 0830 hrs IST of 13 October was reported from Gantiyada (dist Vizianagaram) in Andhra Pradesh. Maximum of storm surge of 1.4 meters above the astronomical tide has been reported by the tide gauge at Visakhapatnam.

COURTESY –IMD



7th oct 8.30

IST HUDHUD seen as DEPRESSION (T1.5) with 25KNOTS developing near andaman sea



NASA TERRA MODIS IMAGE OF CYCLONE HUDHUD NEAR WEST CENTRAL BAY OF BENGAL ON OCT 11TH (11.30IST) INTENSITY OF 90KNTS,PRESSURE AROUND 966MSLP,DVORAK ESTIMATE(T5)

NILOFAR- 3RD MOST INTENSE CYCLONE IN ARABIAN SEA

The salient features of “NILOFAR” are as follows.

i. The track of the system was unique, as it initially moved northwestward on the day

of formation and then re-curved northeastwards. It further moved nearly

northwards very slowly upto 29th evening and then east-northeastwards.

ii. The estimated maximum sustained surface wind speed in association with the

cyclone was about 110 kt (205 kmph).

iii. The estimated central pressure was 950 hPa with a pressure drop of 56 hPa at the

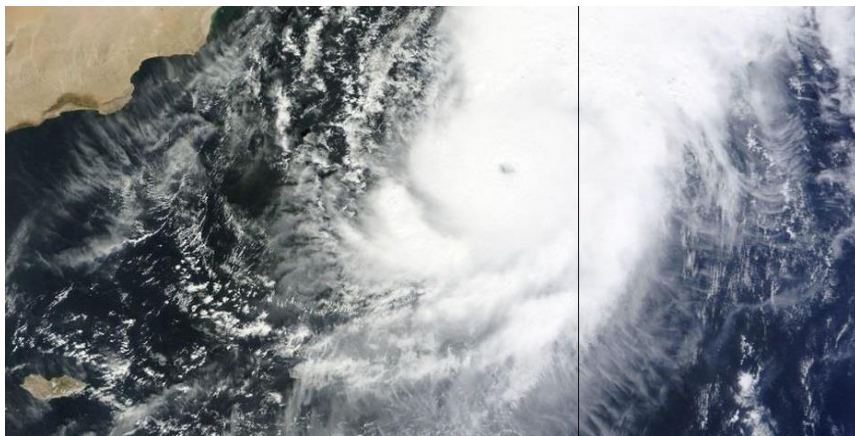
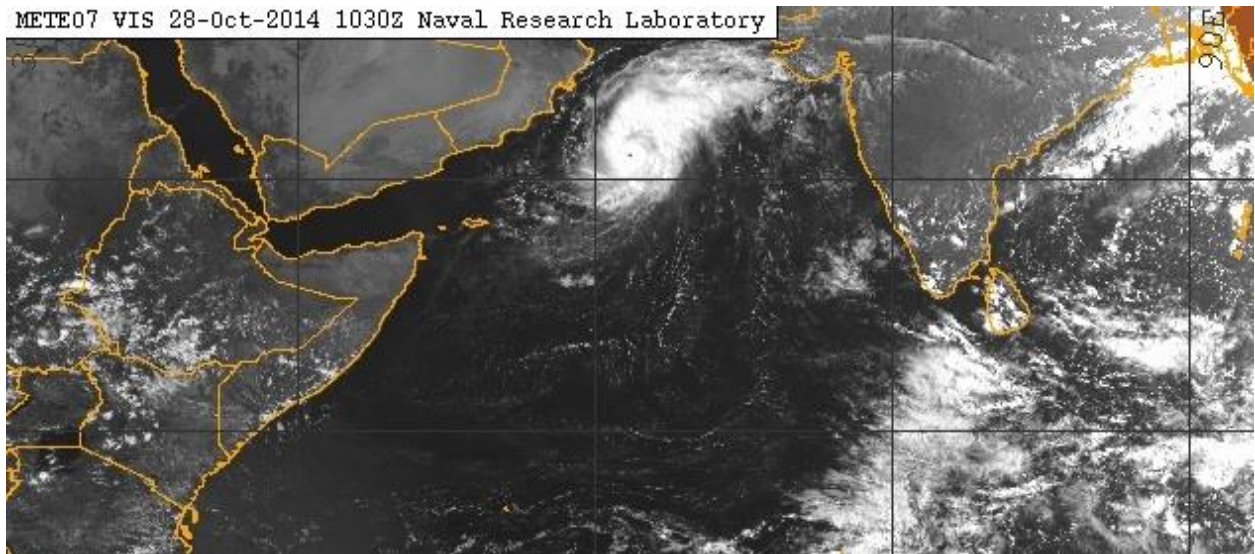
centre compared to surroundings.

iv. It exhibited Rapid Intensification as well as Rapid Weakening. The maximum sustained wind increased from about 100 kmph in the early morning of 27th to about 205 kmph in the early evening of 28th (in 36 hours). It weakened rapidly from VSCS (wind speed of about 200 kmph) in the morning of 29th into SCS (wind speed of about 110 kmph) in the morning of 30th and further into a low pressure area (wind speed < 30 kmph) on 31st morning.

v. Though the re-curvedure of the track could be predicted by NWP models 3 to 4 days in advance, there was large variation in the position and time of the landfall as well as re-curve

COURTESY-IMD

“NILOFAR” exposing PINHOLE EYE with the size of 9 NAUTICAL MILES seen in METSAT imagery on 28th october 4.30pm couple of hours before attaining its peak intensity



NASA TERRA MODIS IMAGE OF “NILOFAR” ON 28TH OCT 11.30IST AS VSCS WITH INTENSITY OF 85KNTS

GENESIS & INTENSIFICATION OF HUDHUD

1. Climatological data suggest there lies a very high probability of cyclogenesis event happening during the transition phase of winds from swm to nem during early october when the atmospheric and oceanic conditions turns conducive as winds shear gets relaxed along with very high sst, high tchp ,and also very warm mid level humidity
2. Similar conditions evolved during the 1st week of October when the convectional area seen developing near tenasserim coast adjoining north andaman sea developing with good convergence and increasing lower level vorticity .
3. It developed into LPA and as the conditions were highly conducive, it gradually developed into cs and subsequently into vscs in next 4 to 5 days

4. Mjo was in phase 6 with amplitude >1 so this might have enhanced the intensification factor. Most NWP models intensified the system and showed varying outputs with different intensity and track
5. ECMWF model is the one to highlight, was showing the system consistently hitting north AP in most of its run right from initial stage of cyclogenesis
6. IMD MME performance was also very good with respect to cyclone track
7. Upper tropospheric ridge was seen around 18N and associated anticyclone to the north-northeast aided favourable outflow for the system at upper level with robust divergence.
8. System got placed near south-southwest quadrant of the upper level ridge so it moved W-NW in its entire life cycle
9. Finally HUDHUD made landfall in Vishakapatnam city and created huge damages to property which is unavoidable and luckily

minimal damages to life because of repeated warnings from IMD and concerned govt agencies

NOTE:

ONE STRIKING FEATURE OBSERVED BY OUR KEA BLOGGERS IS THAT BOTH THE CYCLONE “HUDHUD” IN BAY OF BENGAL AND “NILOFAR” IN ARABIAN SEA ATTAINED THEIR PEAK INTENSITY WHEN BOTH WERE SEEN AROUND 17.6N LATITUDE.

AND JUNE ARABIAN SEA STORM “NANAUK” ATTAINED IT’S PEAK INTENSITY WHEN IT WAS AROUND 17.8N LATITUDE

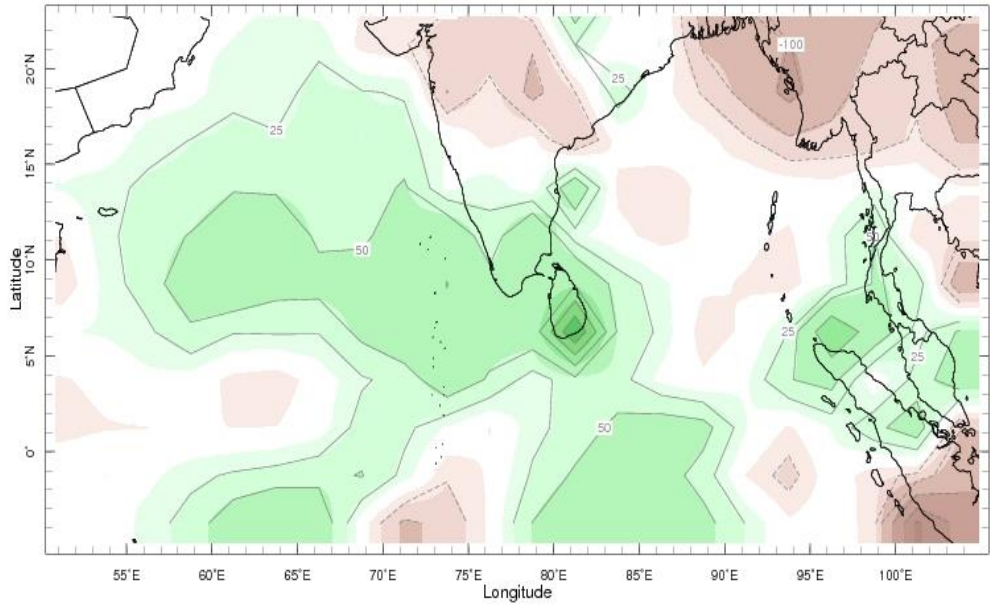
NORTHEAST MONSOON OVERALL ANALYSIS WITH LOCAL AND GLOBAL SIGNALS

1. looking into global signals, ENSO is one among the many factors that influence our NEM precipitation and monsoon disturbances
2. During fall (sep to dec) ENSO was seen in warm phase with above average NINO 3.4 sst which is a clear signal of an elnino .SOI was also seen in negative phase ,indicating elnino conditions.
3. Climatological history, research papers ,along with imd experts (mr.YEA RAJ, mr.ramanan ,mr.kv.balasubramaniam) opinions suggested elnino is NEM friendly , resulted in normal to above normal rainfall in most cases

4. Most long range forecasts including imd seasonal forecasts, ecmwf, IRI showed above average rainfall for S.TN and near normal rainfall for north tamilnadu
5. conditions were more of elnino type with warm **nino** 3.4 & persistence negative SOI in OND season.

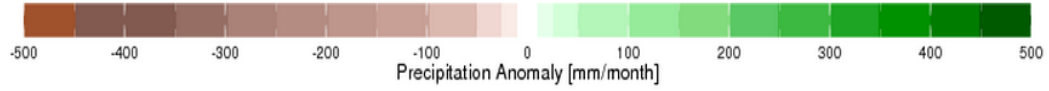
PRECIPITATION ANOMALY OBSERVED

1. timely withdrawal of swm and associated descend in ITCZ LINE (MONSOON TROUGH) hav led to slight early onset of northeast monsoon over coastal TN
2. october rainfall made a departure with positive anomaly all over TN
3. monsoon trough was seen around tamilnadu adjoining lankan latitude

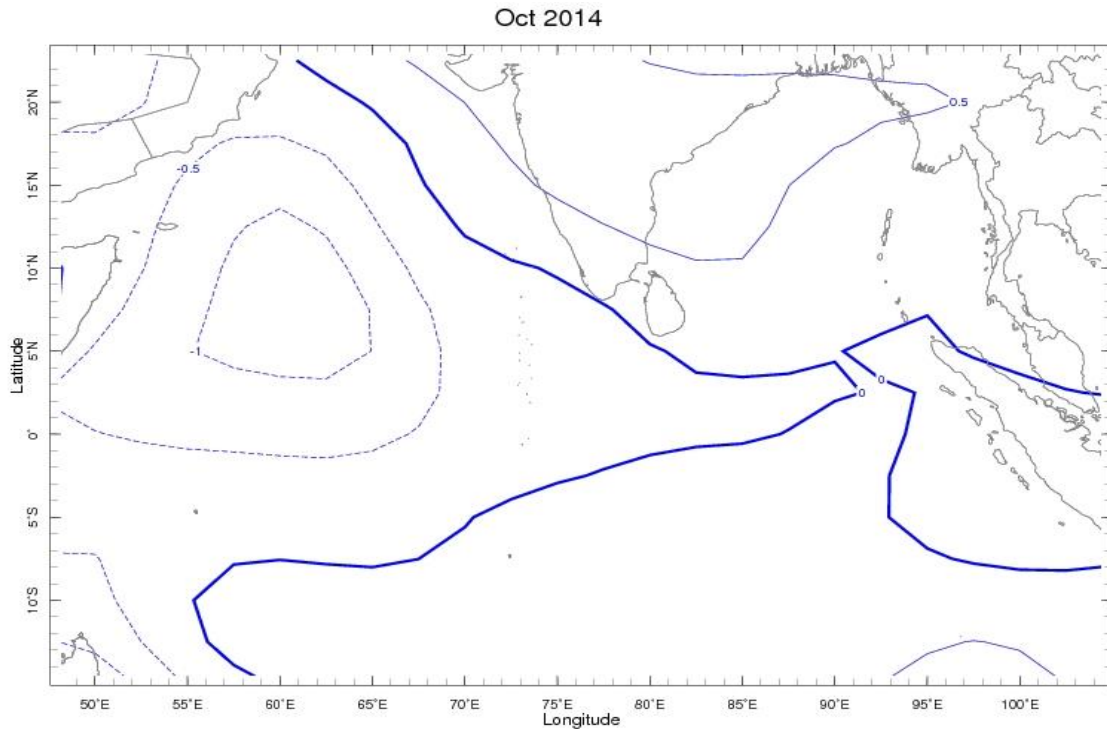


Oct 2014

Oct 2014



October precipitation anomaly map

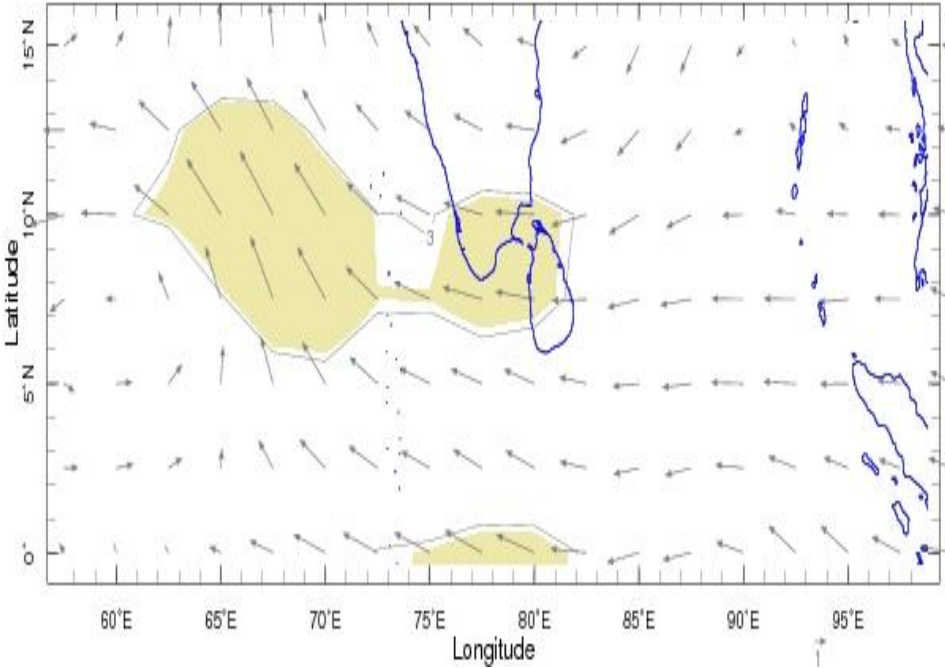


Contour map of monthly sea level pressure anomaly(october 2014)

SOUTHWESTERN PART OF ARABIAN SEA SHOWED a negative pressure anomaly.previous studies and research analysis hav showed negative pressure anomaly in arabian sea hav helped in pulling strong easterlies current though tamilnadu.So this should hav increased the pressure gradient and thereby resulted in strengthening of nem currents .abnormal decrease in pressure over arabian sea is one typical sign of ELNINO conditions

october 850hpa winds anomaly

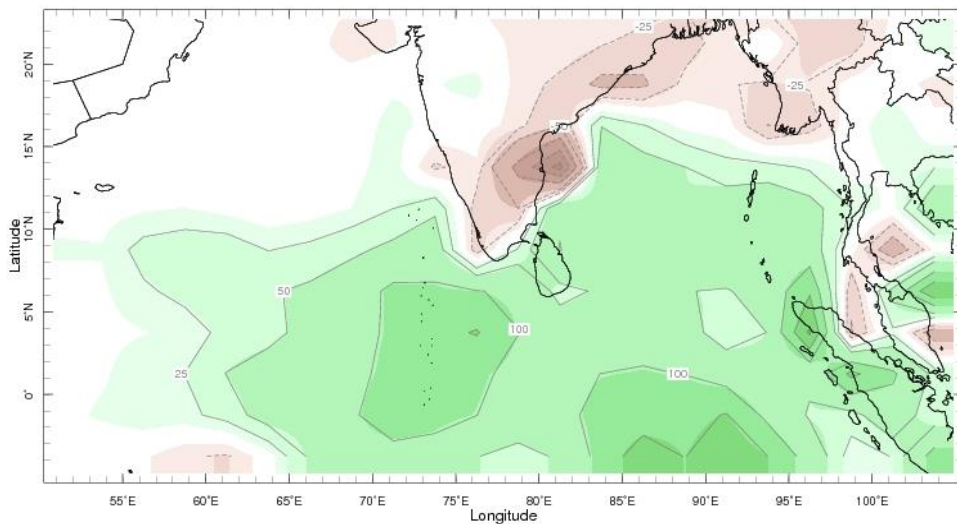
Pressure 850.0 mb Time Oct 2014



Vectors show the resultant wind anomaly direction, and the vector length indicates the magnitude of the resultant wind anomaly. Pale yellow shading denotes speed of the winds anomaly.. here it is 4 to 6m/s

NOVEMBER PRECIPITATION AND WINDS ANOMALY

November precipitation anomaly chart

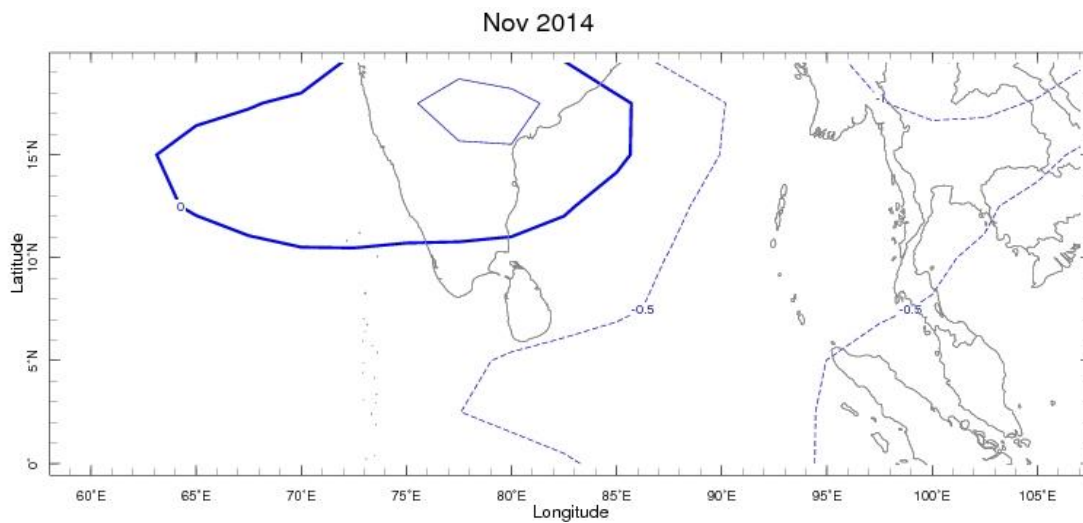


Nov 2014

Unfortunately rainiest month of northeast monsoon turned into driest month for most northern parts of tamilnadu.

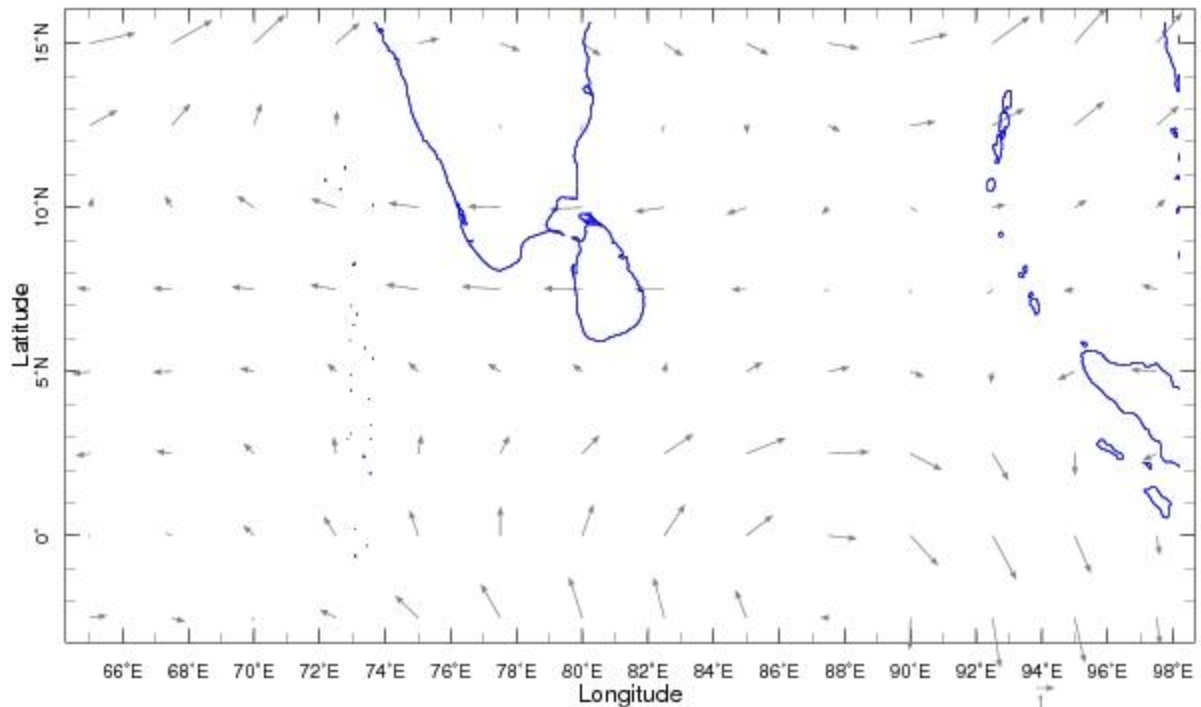
At the same time South tamilnadu had scored exceptionally well after long years.

Few disturbances emerged over bay of bengal in NOVEMBER but unfortunately it failed to favour NORTH TN



Novemeber 2014 pressure anomaly

Pressure 850.0 mb Time Nov 2014



Nov 2014 winds anomaly

Above nov 2014 pressure chart and winds anomaly charts shows Easterly Winds was seen favouring only below 10N

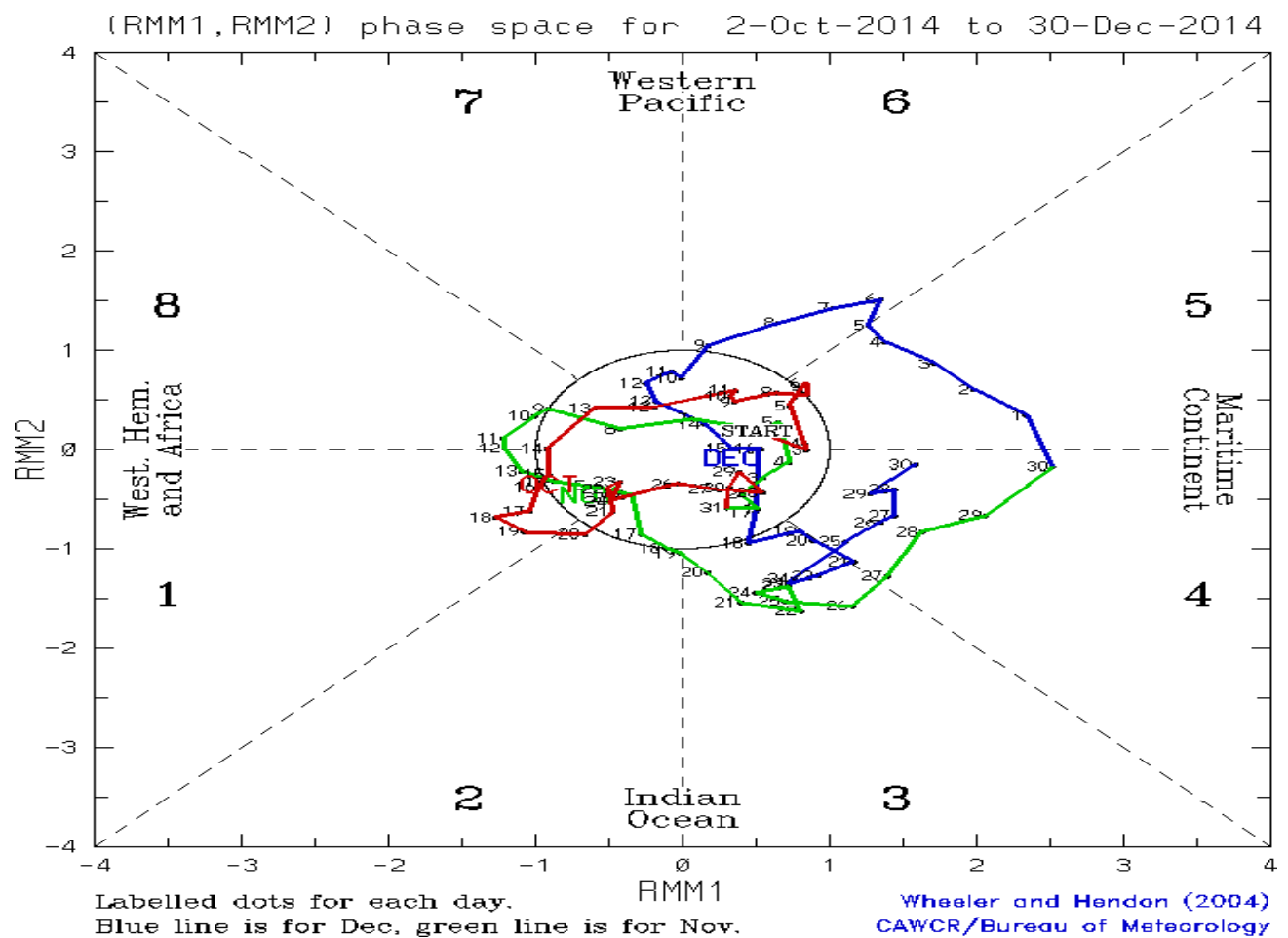
May be Abnormal dip in latitude by high pressure encircling northern TN , failure in extension of trough above 10N and disturbances failing to intensify might be the reasons for below average rainfall over north tn

DECEMBER PRECIPITATION

As ITCZ LINE shifts further south during december and so monsoon slowly ends by mid december for s.andhra pradesh and extreme northern parts of tamilnadu.. if any disturbances/cyclonic system develops in bay of bengal and move NW, system extends the rainfall period for the above mentioned regions.

Similar case evolved in this december. A disturbance developed near sri lanka adjoining sw bay waters...conditions were not highly supportive for this to develop into a big system as normally sst will b decreasing at the fag end of nem period. Marginal sst conditions and moderate shear allowed the lpa to develop into well marked low pressure area..system moved north northwest towards tamilnadu for 36 to 48hrs and ,later it recurved north-northeast slowly. Finally it fizzling out near north andhra pradesh waters due to unfavourable conditions.

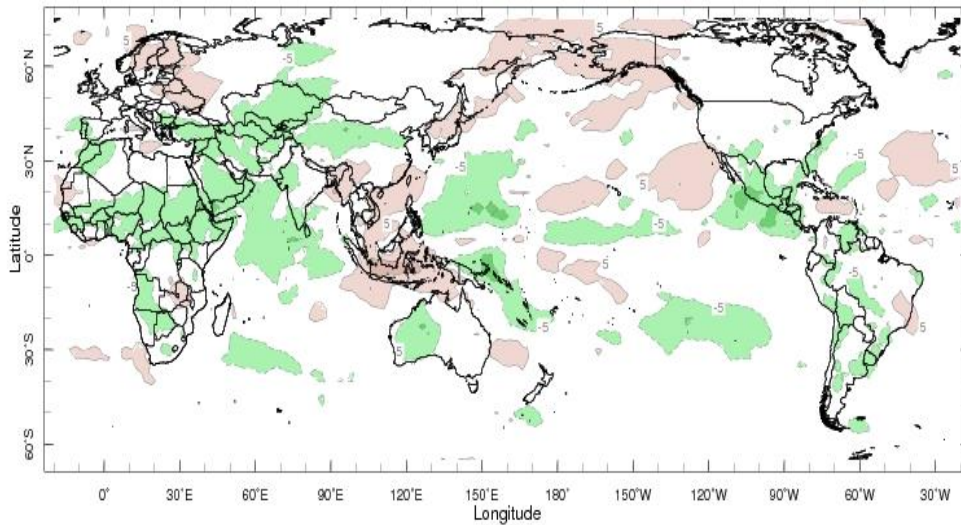
Mjo (october to december)



Mjo had made its presence in indian ocean in all three months with varying time periods and varying amplitude.

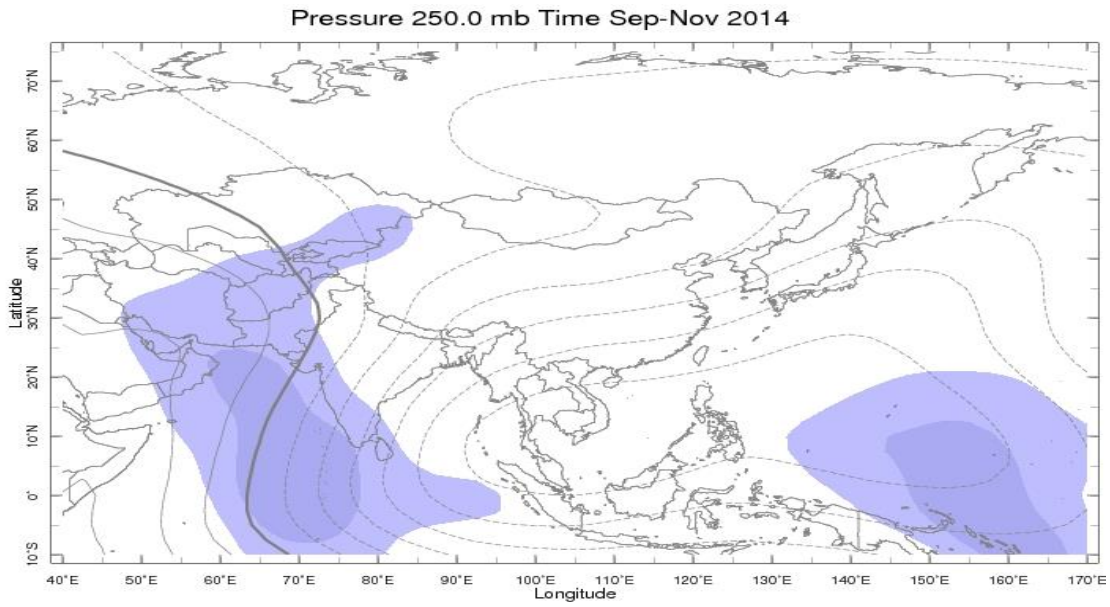
Mjo was in eastern indian ocean adjoining bay of bengal waters in three different occassions. Oct 27th to nov1st ,nov 19th to nov 26th and dec 18th to 25th.

seasonal olr observed(sep -nov)

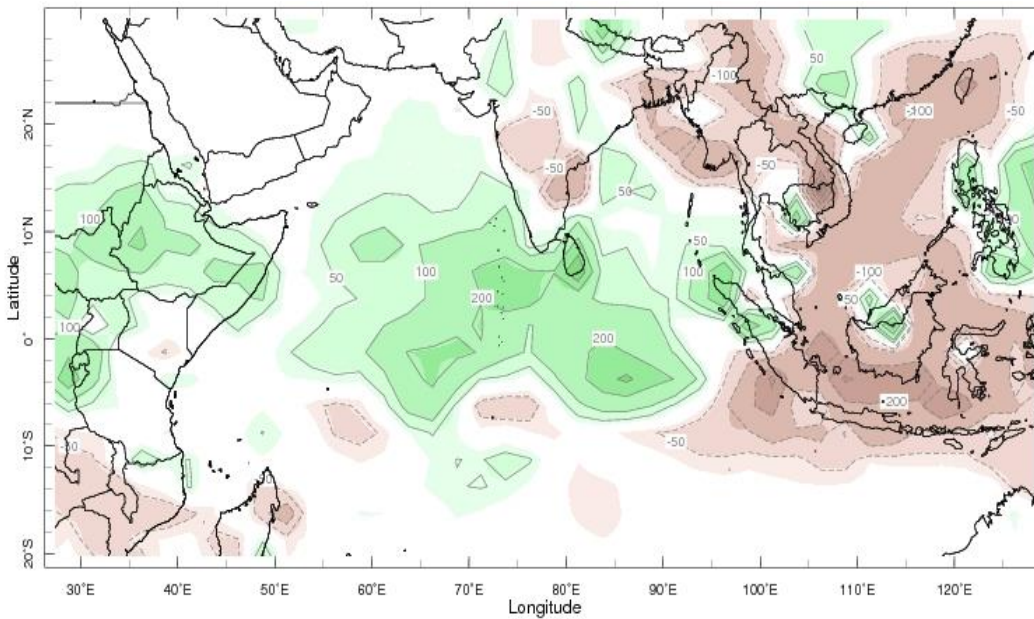


Sep-Nov 2014

(SEP –NOV) upper level velocity potential(250MB)



SEASONAL PRECIPITATION OBSERVED(sep –nov)



Sep-Nov 2014

CONCLUSION :

Considering certain parameters , precipitation anomalies pattern & atmosphere- oceanic conditions, Elnino role is clear with our 2014 NEM

Below average PRECIPITATION & OLR over maritime continent, warm 3.4nino area,above avearge precipitation over southern part of tamilnadu and srilanka are the concrete evidence to say elnino influence over NEM

IOD was seen in slight positive index althrough the season(OND) .warm western indian ocean and ascending limb of walker circulation(ELNINO CONDITION) could be the reason for positive dipole index evolving concurrently with NEM.

Below average cyclonic disturbances in bay of bengal should be well analysed before concluding.. but at the same time,elnino and positive iod is quite well known for suppressing the cyclogenesis in bay

of bengal .both positive iod and elnino event happened concurrently with this nem monsoon must b noted.

ACKNOWLEDGEMENT

I sincerely thank our captain & blog owner mr k.[EHSAN AHMED](#) for providing us a nice platform to discuss about the weather around us.and also I thank each and every bloggers for your valuable posts and for being wit us.

I personally want to extend my thanks to IMD experts mr.RAMANAN, mr.YEA RAJ and mr BALASUBRAMANIAM for giving their valuable time and opinions on northeast monsoon then and there.

