

PAPER REVIEWED DURING THE MONTH OF FEBRUARY 2010

A. SAT MET DIVISION

1. **The Advanced Dvorak Technique: Continued Development of an Objective Scheme to Estimate Tropical Cyclone Intensity Using Geostationary Infrared Satellite Imagery**

By - **TIMOTHY L. OLANDER AND CHRISTOPHER S. VELDEN, CIMSS, University of Wisconsin, Madison, Wisconsin, WEATHER AND FORECASTING, Vol 22, April 2007**

Review by C. S.Tomar, Meteorologist, Sat. Met Division

OBJECTIVE

The accuracy of the ADT (an automated, objective, and modified/advanced version of the old DT) is statistically competitive with the original Dvorak technique, and can provide objective tropical cyclone intensity guidance for systems in all global basins.

2. **Mesoscale Convective Complexes** BY - ROBERT A. MADDOX,

Review by - Suman Goyal, Director (S.A.U.), Sat. Met. Division

OBJECTIVE

A preliminary conceptual model of the life cycle of MCC systems is presented using enhanced, infrared satellite imagery in conjunction with conventional surface and radar data over Central U.S.

3. **Water Vapour profile by GNSS Tomography Applicability in Indian Context**

Review by - N. Puviarasan & R. K.Giri, Sat . Met. Division

4. **Ge, Marong., Calais, E. and Haase, J., 2000, "Reducing satellite orbit error effects in near real- time GPS zenith tropospheric delay estimation for meteorology", Geophysical research letters, 27,13, 1915-1918.**

Review by - R.K. GIRI

OBJECTIVE

In this paper authors investigate the the influence of IGS predicted and precise satellite orbits in the estimation of Zenith tropospheric dealy (ZTD). They showed

the use of precise orbits Have negligible bias and RMSE less than 6.0 mm in ZTD estimates. Their strategy based on the estimation of three Keplerian Parameters (Semi-major axis, inclination and argument of perigee) that represents the main error source in predicted (broadcast) orbits

5. Mesoscale Convective Complexes Over Indian Monsoon Region

By - Arlene G. Laing & J. Michael Fritsch

Reviewed by - Suman Goyal , Director (S.A.U.), SatMet Division.

This study presents a brief climatology of Mesoscale Convective Complexes over the Indian subcontinent (ISC).

6. Now casting of Thunderstorm using Integrated Precipitable Water Vapor Contents measured by ground based GPS over Guwahati Airport of India by Sh Virendra Singh et al at Eumetsat Satellite Meteorological conference at Bath UK in 2009

Review by - Sh Virendra Singh et al at Eumetsat Satellite Meteorological conference at Bath UK in 2009

Reviewed by - D K Malik , Director (GPS), Satellite Meteorology Division

OBJECTIVE

Water Vapour is a highly variable quantity , both spatially and temporal Estimation of water Vapour in the atmosphere is important for short term forecast of precipitation Water vapour can be computed using GNSS data providing total tropospheric zenith delay

B. Northern Hemisphere Analysis Centre

1. "A study of decreasing storm frequency over Bay of Bengal"

By - Sujata K. Mandke and Usha V. Bhide (IITM, Pune): *J.Ind.Geophys.Union (2003) Vol. 7, No.2 pp53-58*

Reviewed By Sri Charan Singh Director

Conclusions

- Examination of Sea Surface Temperature (SST) and Storm Frequency (FS) over Bay of Bengal during monsoon season using long period data from 1901-1998 has

revealed that the SF has decreased on decadal scale since 1980 in spite of increasing SST.

- Mean of SF for epoch 1(1958-1980) is found to be different than that for epoch 2 (1981-1998)
- It to be seen that SF is reflected in atmospheric circulation change over Bay of Bengal on decadal scale.
- Anomalies of these parameters are of opposite sign for the periods prior to and after 1980.
- Results suggest that change in all the atmospheric parameters from epoch 1(1958-1980) & 2 (1981-1998) are related to decreasing storm frequency in spite of favorable of SSTs.

2. **“Tropical cyclone intensity in relation to SST and moisture variability: A Global Prospective.**

By - Robbie Berg* *RSMAS / University of Miami, Miami, Florida (USA)*

Reviewed by : Charan Singh, Director

Conclusions

- The preliminary results indicate that variations in SST in the wake of TCs do in fact differ from ocean to ocean.
- By these examples, it seems apparent that SST in the western North Pacific is not affected by TC interactions as much as in the North Atlantic or South Indian Oceans despite the fact that the chosen Pacific storm is stronger than the Atlantic and Indian storms.
- These results are also consistent with climatological ocean mixed-layer depths (OMLD).
- OMLD in the Atlantic Ocean (in September) and the Indian Ocean (in April) range from 25-50 m while the OMLD in the Pacific Ocean (in October) averages between 50-75 m.
- The deeper OMLD in the Pacific Ocean explains the fact that SST associated with Super typhoon Zeb did not decrease as much as SST associated with Hurricane Floyd and Tropical Cyclone Paul.

3. **“Decaying nature of Super Cyclone of Orissa after landfall (decay of SCS & VSCS after landfall over east coast of India In General)”**

By - S.R.kalsi, S.D.Kotal and S.K.Roy Bhowmik, 2003, *Mausam*, 54,2,393-396

Reviewed by : Charan Singh, Director

Conclusions

- The study shows that the wind speed associated with the Orissa super cyclone decays exponentially with time after landfall and value of time constant of decay is 0.0991 per hour.
 - The wind speed after landfall estimated for the VSVS (Gopalpur) of October 1999 applying this empirical technique is found to be consistent with the observed field.
 - Forecasters growing demand to derive an empirical method for predicting wind field associated with tropical cyclones after landfall.
 - The empirical method calibrated based on Orissa super cyclone appears to be promising in this regard.
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C. HYDROLOGY

1. " Hydrometeorological Study of Severe Rainstorms of North Bihar "

by Sh. Ashim K. Ghosh & K. Prasad of Meteorological Office , Patna
Reviewed by Ejaz Ahmad, Director,

The study contains hydrometeorological analysis of severe rainstorms Of North Bihar comprising of the catchments of Gandak, Burhi Gandak, Bagmati, the Adhwara group and Kamala. Rainstorm pattern in relation to location tracks of Monsoon Depressions/ Low Pressure Area has been studied. Out of 28 rainstorms, the two severe rainstorms have been studied in detail ;

- (1) 10-12 September , 1974 centered near Motihari
- (2) 05-06 October , 1978 centered near Monghyr

The Depth- Area- Duration of 1-day duration of 11th Sept.' 1974 is 39.5 cm. which is the highest. The Depth-Area-Duration of 2-day duration of 05-06 Oct.' 1978 is 56.0 cm. which is the highest.

The rainstorm of Sept.' 1974 had its central region in Plains of North West Bihar and adjoining East Uttar Pradesh .It was caused in association with a low pressure area between Allahabad & Varanasi . This rainstorm was responsible for causing heavy floods in Burhi Gandak. The rainstorm of 5-6 Oct.'1978 occurred in association with a deep depression which originated over Bay of Bengal and crossed the West Bengal Coast as a cyclonic storm on 4th and was centered at Bihar Plains about 50 Km. South West of Patna on 5th and 6th Oct. The Adhwara group of rivers experienced a high flood due to this rainstorm.

1Most of the severe rainstorms occurring in the region were found to be associated with monsoon depression/ low pressure areas. This study has revealed that severe rainstorms in this area occur mostly in the month of September. It is not mentioned in the paper that which rainstorm has been used for 3-day and 4-day duration.

These rainstorms may be used in three projects of Nepal which are under study.

2. **“Quantitative Precipitation Forecast (QPF) for Teesta basin and heavy rainfall warning over Teesta basin & adjoining areas in north Bengal & Sikkim using synoptic analog method”**

by G. N. Raha, K. Bhattacharjee, A. Joardar, R. Mallik, M. Dutta and T. K. Chakraborty
Mausam, Vol. 60, 4 (October 2009), pg. 491-504
Reviewed by Dr. Ashok K. DAS,

This article presents the method to issue Quantitative Precipitation Forecast (QPF) for Teesta catchment. A synoptic analog model has been developed analyzing 10 years (1998-2007) data for Teesta catchment.

Conclusions

1. Whenever a low, depression or a cyclonic circulation lies over Bay of Bengal and West central Bay, Andhra Pradesh and Telengana QPF may be issued in the range 1-10 mm.

2. Only five types of synoptic situations have been identified for which computed mean average areal precipitation (AAP) lies in the range of 11-25 mm *viz.*, Trough over SHWB and Sikkim (T1), Upper air cyclonic system over Bihar with trough passing through SHWB & Sikkim (C2T1), Upper air cyclonic circulation over East Uttar Pradesh & adjoining Bihar with trough passing through SHWB & Sikkim (C11T1), Low over Bihar with trough passing through SHWB & Sikkim (L2T1), Depression over Jharkhand. These 1 & 2 cases are verified during south-west monsoon season 2008 over Teesta basin & adjoining areas in North Bengal & Sikkim. Out of 122 cases, QPF has been tallied with the AAP on 94 cases (77%), out by one stage on 28 cases (23%) and out by two stages nil.

3. **Heavy rainfall Situations:** Presence of synoptic systems may warrant for issue heavy rainfall warning in the catchment of Teesta & adjoining areas in North Bengal & Sikkim such as: Trough over SHWB & Sikkim (T1), Low over Bihar along with trough passing through SHWB & Sikkim (L2T1), Upper air cyclonic circulation over Jharkhand along with trough passing through SHWB & Sikkim (C3T1), Upper air cyclonic circulation over East Uttar Pradesh & adjoining Bihar along with trough passing through SHWB & Sikkim (C11T1). This is verified during south-west monsoon season 2008 over Teesta basin & adjoining areas in North Bengal & Sikkim. It has been found that the occurrence of heavy rainfall over the study area is in good agreement with the forecast. Out of 122 cases, heavy rainfall warning has been tallied with the observed rainfall on 72 cases (59%). Results revealed that there exists a good agreement between day-to-day QPF with corresponding realized AAP calculated over this basin next day.

Comments

1. Rainfall category may be tried in the finer ranges.
2. Different dynamical model may also be studied for the catchment for QPF.

3. “Multivariate ENSO index and Indian Monsoon Rainfall: Relationships on monthly and sub divisional scales”.

by Dr. O.P Singh I M D ,New Delhi Me_teorol.Atmos.Sci,2001,Vol-78,pp 1-9.

Reviewed by Dr T N Jha, Director,

Objective

The objective of this paper is to examine simultaneous and lag correlation between MEI/SOI and IMR in 35 met subdivision in India. Sub divisional monsoon rainfall data from 1960-1990 has been used pertaining to the met sub division to derive percentage rainfall departure . Bimonthly value of MEI to compute lag correlations.

Results

Results show that maximum negative correlation between MEI of April-May on seasonal rainfall departure over HP, hills of W UP,LKDP, Punjab, E Raj, TN & Pudicherry and NNMT and poorly correlated with monsoon rainfall of met sub divisions of central and eastern India. SOI/MEI does not affect rainfall departure over NE and Eastern India. On monthly scale ,ENSO condition prevailing before June seem to cause weaker onset phase of Bay of Bengal branch of the monsoon over north eastern India but onset phase of Arabian sea branch over the western and peninsular India tends to remain stronger than normal. Several studies have been made and found simultaneous significant correlation with SOI with IMR.It is to be noted that there is no one-to-one relation of the indices with monsoon rainfall. In case of absolute El Nino and La Nina year , impact of the indices on rainfall departure are more prominent over eastern India catchments namely Kosi, Kamala and Gandak. During mixed year role SOI/MEI is not discernible. Considering MEI along with ENSO strength, one can ascertain rainfall departure particularly deficient and excess rain over the catchments.

4. “Probable maximum precipitation for the catchment of Koyana dam

by P R Rakhecha, A K Kulkarni et .al., I I T M ,Pune, Mausam,1998,Vol 49,2, pp 211-216

Reviewed by Dr T N Jha,Director

Objective

Objective of this study is to compute PMP values to incorporate spillway capacity for maximum flood.

Data: Daily monsoon rainfall data of 5 station around the catchment from 1901 onwards.

Weather System The weather system that influence heavy rainfall over the catchment are the formation and subsequent movement of cyclonic storm and depression from Bay of Bengal .

Standard Project Storm and P M P have been calculated from the daily rainfall data using Depth-Duration and Depth-Area- Duration method. S P S was found during 21-23 July 1912. Accordingly 1-day,2-day and 3-day rainfall has been calculated . 1-day,2-day and 3-day rainfall by DAD method was found 38,69 and 93 cm. Moisture maximization factor has been applied and P M P values for 1-day,2-day and 3-day are calculated 48,87 and 117 cm respectively.

statistical method 1-day PMP value was found 54 cm . I M D, Hydromet division has also calculated 1-day PMP for the catchment which is found 55.1 cm which is higher than the values calculated in the paper because rainstorm has been transposed over the catchment . Similar is the case in respect of statistical method.

D. O/o DDGM (UI), New Delhi,

1. Topic of Discussion “CELLULAR TOWER DATA USAGE in Meteorological aspects and radar” – through the following papers

“Technical Note: Novel method for water vapour monitoring using wireless communication network measurements”, N. David, P. Alpert & H. Messer, Atmos. Chem.. phys., 9, 2413-2418, April 2009

“Retrieval of rain drop size distribution using telecommunication dual-polarization microwave links”, Alexis Berne & Marc Schleiss, 34th Radar Conf 2009

“Frontal rainfall observation by a commercial microwave communication network”, Artem Zinevich, Hagit Messer & Pinhas Alpert, JAMC-2009, pp.52

[Reviewed by B. Arul Malar Kannan, Meteorologist I,](#)

Overview

- Utility of commercial Backhaul microwave tower attenuation data in rain monitoring, frontal tracking, DSD, applications at surface levels.
- Comparison of data with observed humidity gauge, radar, disdro-meter,
- Statistical analysis justifying the findings of usability
- The latest developments in Doppler radar products for thunder initiation studies
- Usage of the data for model initiation especially in concern with surface moisture and humidity for betterment of parameterizations.
- The feasibility of similar study in the Indian context
- Use of Indian commercial network data for the use of meteorological aspects

2. Review of the paper **“Correction of Radiosonde Pressure and Temperature Measurements Using Simultaneous GPS Height Data”**

By Yoichi Inai, Fumio Hasebe, Kensaku Shimizu, and Masatomo Fujiwara
published in Journal of Meteorological Society of Japan, 2009, Vol. 5.

Reviewed by Gajendra Kumar, Met Gr. I,

Overview

- In this paper, a method for correcting the radiosonde pressure and temperature data is proposed by taking the advantage of simultaneous GPS height (ZGPS).
- The correction is made by adjusting the observed pressure and temperature so that the height (ZPTU) calculated from radiosonde with pressure sensor agrees with ZGPS.
- The biases in Vaisala RS80 pressure and temperature measurements are estimated using the Soundings in the Equatorial Region campaign data.
- The estimated pressure bias is found positive below ~7 km and negative above it. The bias above 15 km is statistically significant. The daytime temperature bias lacks statistical significance due to fluctuations in the results.
- The method proposed in the present analysis may serve to correct the radiosonde data because it could be applicable to a set of radiosonde observations without relying on simultaneous reference observations. This technique could be used to improve the reliability of the radiosonde data for all purposes.

3. Review of paper **“Human Comfort at Chandigarh”**

by S/Sh Manmohan, S.C. Bhan, Dr. S D Attri, published in Vayu Mandal, Vol.32 No.3-4

Reviewed by: Rupa Jaggi, Meteorologist –I,

Overview

- Temperature Humidity Index (THI) has been used to determine the human comfort/discomfort at Chandigarh. Fortnightly means of THI have been computed for synoptic hours from dawn to dusk based on daily data for four year (1996-1999).
- The THI values are divided into five categories on the basis of feeling of the people. Maximum cold discomfort was experienced from second fortnight of December to second fortnight of January where as maximum hot discomfort was felt from May to August. March, October and November were the months of maximum comfort.
- A monogram depicting different values of Temperature –Humidity Indexes has also been prepared to quantify comfort zones from combination of temperature and humidity.

4. Two-layer patterns of enhanced ZDR in clouds,

By Jelena Andric, Dusan Zrnica, and Valery Melnikov, 34th Radar Conference 2009
Reviewed by Rakesh Kumar, Met.Gr- I

Overview

- In this paper it has been shown that with the help of Dual Polarimetric Radar it is possible to obtain two enhanced layer of increased reflectivity in clouds in place of one which is obtained with single Polarimetric radar at the melting layer.
- This enhanced layer of reflectivity is obtained well above the melting layer but is not related to melting. The enhanced layer of reflectivity is obtained due to increase in the number of dendrites.
- The parameters used in the study are able in distinguishing precipitation and non-precipitation classification, and also capable of explaining cloud dynamics.
- In future, micro physical model combined with scattering computations may be used to quantify these preliminary findings.
- Once on getting dual polarization radar similar study is to be attempted in understanding the cloud dynamics in tropics.

5. Review of paper **“TOTAL SCAN A FULL VOLUME SCANNING STRATEGY FOR DOPPLER WEATHER RADARS”** by Dominik Jacques*, I. Zawadzki J. S. Marshall Radar Observatory, McGill University, Canada

Paper Reviewed by Suresh Chand, Director,

Overview

- In this study, it was discovered that vertically retrieved Doppler velocity can be used to diagnose misreading of the antenna elevation of Doppler weather Radar.
 - Polarimetric measurements at vertical incidence will allow the calibration of ZDR of DWRs in IMD's Network in future.
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E. RMC, NEW DELHI

F. OTHERS