

## LETTERS OF INTENT

- **Project name;** Utility of Satellite derived winds for Monsoon and Cyclone studies over Indian region.

- **Project (proposal) leader (name, affiliation, address);**

- 1 Mrs. Suman Goyal, Scientist-E, Satellite Application Unit  
Satellite Meteorology Division  
India Meteorological Department  
Lodi Road, New Delhi-110003 (India)

- 2 Dr. M Mohapatra, Scientist-E, Cyclone Warning Division  
India Meteorological Department  
Lodi Road, New Delhi-110003 (India)

- 3 Sh. S C Bhan, Scientist-E, DGM Secretariat  
India Meteorological Department  
Lodi Road, New Delhi-110003 (India)

- 4 One member from EUMETSAT

- **Team composition (participating organisations and eventually stakeholders);**

- 1 Mrs. Suman Goyal, Scientist-E, Satellite Application Unit  
Satellite Meteorology Division  
India Meteorological Department  
Lodi Road, New Delhi-110003 (India)

- 2 Dr. M Mohapatra, Scientist-E, Cyclone Warning Division  
India Meteorological Department  
Lodi Road, New Delhi-110003 (India)

- 3 Sh. S C Bhan, Scientist-E, DGM Secretariat  
India Meteorological Department  
Lodi Road, New Delhi-110003 (India)

- 4 One member from EUMETSAT

- **Identification of satellite CDR capability (geophysical parameters, satellite sensor record (inter)-calibration, processing chains, algorithms);** Satellite Winds and derived parameters like Wind shear, Shear tendency, 850 hPa Vorticity, Lower level convergence, Upper level divergence from Meteosat satellite.

• **Justification of the project including a very brief summary of the related work from the literature, and an assessment of the feasibility of the proposed activity;**

1. Development of climatology
2. Diurnal variation of the products
3. Intraseasonal /Interannual variation

• **Current and targeted Maturity Level (see Maturity Matrix Model);** Satellite is in use in India Meteorological Department since 1960 after the launch of first Satellite TIROS-1. With later versions of the TIROS satellites, night-time observations with infrared sensors became possible. Subsequently, geostationary meteorological satellites, like GOES, GMS and Meteosat placed weather under round-the-clock surveillance. Indian meteorologists have been privileged in this respect by having a succession of six geostationary satellites of the INSAT series, with meteorological payloads, located over the Indian Ocean since 1982. India's own INSAT-2E satellite launched in 1999 carried an advanced payload operating in three channels – visible, infrared and water vapour. Besides this, it carried a CCD camera with one km. resolution and with three channels visible, near infrared and short wave infrared.

A geostationary meteorological satellite (METSAT) system devoted totally to meteorology has been launched in 2002, it has been renamed as Kalpana-1 and is currently the operational satellite system being used by IMD. INSAT-3A satellite has been launched in April 2003 which carries identical payloads as in INSAT-2E.

Meteosat data is available atleast for last 10 years. We don't have qualitative atmospheric Motion Vectors & CMV's over Indian region from Indian Satellites. These products are available from EUMETSAT (Meteosat-5&7). EUMETSAT data is available from 2003 to 2012 . It is proposed to develop a satellite climatology of winds over data sparse north Indian Ocean region. Further the threshold values of cyclogenesis parameters like vorticity, divergence, convergence, wind shear etc. derived from Meteosat data will be attempted. The intraseasonal variation will be analysed including onset, withdrawal, active and break phases of monsoon. The interannual variation will be analysed to find out the circulation features associated with excess and deficient monsoon years and years with active and suppress cyclogenesis.

• **Expected results, challenges and potential contributions of the project;**

The following are the expected results:

- (i) Development of Satellite climatology of winds at lower, middle and upper troposphere over Indian region for different month and season.
- (ii) Determination of threshold values of cyclogenesis parameters and monsoon activity.

- (iii) Physical understanding of processes involved in cyclogenesis and intraseasonal /interannual variation of monsoon.
- (iv) The validated results of the study will be helpful in assimilation of Satellite data in NWP models.

Challenges: The challenging task for this project is to

- (i) Collect the wind and other derived parameters from Meteosat atleast for the last 10 years.
- (ii) Quality check of the data.
- (iii) Formatting of the data into a fixed grid point values for development of grid point climatology.

Potential Contribution: This project will potential contribute to

- (i) Better understanding of physical processes.
- (ii) Improvement in monitoring and prediction of cyclogenesis & monsoon activity over data sparse north Indian Ocean region.

• **Expected project duration and tentative schedule; 3 years,**

1<sup>st</sup> year: Formulation of the project, collection of data.

2<sup>nd</sup> year: Development of satellite climatology.

3<sup>rd</sup> year: Determination of threshold values, Preparation of report and publication.

• **Funding situation (current grants, expected funding proposals);** No funding is required for the above work except that data will be collected from EUMETSAT free of cost under the framework of SCOPE-CM

• **Needed and available processing capacities;** The processing capability available at IMD will be utilized to carry the above work. No additional capability is required for this purpose.

• **Curriculum vitae of the key investigators and list of key partners (maximum 1 page for each investigator; these are not included in the 4-page limit of the letter of intent);** (attached below)

## Biodata of Mrs. Suman Goyal

- 1 **Name** SUMAN GOYAL
- 2 **Date of Birth** 21 January 1961
- 3 **Sex** Female
- 4 **Affiliation** India Meteorological Department,  
Mausam Bhawan, Lodi Road,  
New Delhi-110003
- 5 **Designation** Scientist-E
- 6 **Postal Address, Phone No with E. Mail & Fax No**  
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(ii) suman.imd@gmail.com
7. **Educational qualification** M.Sc (Mathematics) and M Phill (Mathematics)
8. **Present duties & Experiences:**  
Working as in-charge of Satellite Application Unit, Satellite Meteorology Division of IMD, New Delhi. The area of responsibilities includes:  
Monitoring tracking of severe weather events by interpretation of satellite imageries and products. Monitoring tracking of tropical cyclones over Indian seas with the help of satellite imageries and products. Software development for data processing etc.
9. **Training:** I have undergone trainings in (i) General Meteorology (Weather forecasting), (ii) Application of satellite, radar and NWP in weather forecasting, nowcasting and heavy rainfall warning.
10. **Foreign assignments:** Visited France, Switzerland, USA, North Korea in connection with different government assignments and training/seminar.
11. **Recent Research contributions & Publications:**
  1. 'A Technical Report on Interpretation and Application of Satellite Imageries/Products in Weather Analysis' (Met Monograph No. Sat Met 01/2010)
  2. 'A Satellite Based Study of Pre-Monsoon Thunderstorms (Nor'westers) over Eastern India and their organization into Mesoscale Convective Complexes' published in MAUSAM volume 63 no. 1, 2012.
  3. 'Comparison of Satellite based Centre and Intensity with Best Track Parameters of Tropical Cyclones over the North Indian Ocean' published in MAUSAM volume 64 no.1, 2013.
  4. 'Use of Microwave imageries for Tropical Cyclone centre and intensity estimation' accepted for publication in Springer
  5. 'Satellite Aspects of Monsoon 2008, 2009, 2012 published in Monsoon reports of 2009, 2010, & 2013 issues.

Place: New Delhi -03

Date: 30. Jan. 2013

(Suman Goyal)

Scientist-E

## Bio-data of Dr M Mohapatra

1. **Name** M. Mohapatra
2. **Date of birth** 12<sup>th</sup> August 1965
3. **Sex** Male
4. **Affiliation** India Meteorological Department
5. **Designation** Scientist-E
6. **Postal Address, Phone No with E. Mail & Fax No**  
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E Mail (i) mohapatra\_imd@ yahoo.com  
(ii) mohapatraimd@gmail.com
7. **Educational qualification** M.Sc (Physics) and Ph.D (Physics)
8. **Experience:** 19 years experience in (i) Synoptic Meteorology,  
(ii) Operational Weather Forecasting and  
(iii) Cyclone Warning
9. **Training:** I have undergone trainings in (i) General Meteorology (Weather forecasting), (ii) Satellite and Radar input for cyclone warning, (iii) Application of satellite, radar and NWP in weather forecasting, nowcasting and heavy rainfall warning, (iv) Hurricane Forecasting and Warning and Public Weather Services
10. **Foreign assignments:** Visited Kathmandu, Myanmar, Oman, USA, France, China and Vietnam on ex-India deputation in connection with different government assignments and training.
11. **Significant contributions/achievements:**  
Significant contributions/achievements in weather forecasting and cyclone warning activities include (i) Research and development, (ii) Cyclone warning services, (iii) Other weather monitoring and forecasting services. (iv) Project management, (v) Planning. The number research papers published in reviewed national and international journals is 50.
12. **Awards and recognitions received**
  - (i) **Chintamani Memorial Medal- 1985** from Rotary Club of India, Bhadrak branch for securing highest mark in physics in B.Sc.
  - (ii) **Commendation certificate during 1989** from Defence Research and Development Organisation, Ministry of Defence, Govt. of India for significant contribution to Integrated Guided Missile Development Programme
  - (iii) **Certificate of Merit for Young Scientist Award – 2008** by Ministry of Earth Sciences, Govt. of India for outstanding contribution in the field of atmospheric science and technology.
  - (iv) **25<sup>th</sup> Biennial Mausam Award (2008-2009)** for the research paper, entitled, ‘Daily summer monsoon rainfall over northeast India due to synoptic scale systems’ published in the journal, MAUSAM (2008, Vol.59, No. 1)
  - (v) **National Editor** for Publication of ‘Annual Cyclone Review of WMO/ESCAP Panel since 2006 and **National correspondent** for publication of WMO/ESCAP Panel News
  - (vi) **Expert Member** in various national and international committees
  - (vii) **Reviewer** for publication of research papers in (a) Journal, ‘Mausam’ (b) International Journal of Natural Hazards, (c) International Journal, ‘Marine Geodesy’, (d) Journal of Earth System Sciences and (e) Proceedings of First and Second International Workshop on Tropical Cyclones and Climate Change organized by WMO at Muscat, Oman and New Delhi India

## Bio-data of S.C. Bhan

1. Name : S.C. BHAN
2. Date of Birth : 02 March, 1964
3. Sex : Male
4. Affiliations : India Meteorological Department (IMD),  
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### 7. Present duties & Experiences:

- i. Working as in-charge of the Secretariat of the Director General of Meteorology, India Meteorological Department, New Delhi. Presently, I am primarily involved in planning for new observational tools, product development aspects and service delivery aspects and prioritizing research areas under modernization programme of IMD including the network of Automatic Weather Stations, Radars and Satellite observations for operational and research purposes.
- ii. Heading the Human Resources Division of IMD.
- iii. Have worked as operational weather forecaster for last 20 years including seven years as head of state weather forecasting centre and eight years as head of regional and national weather forecasting centres. The general assignments included monitoring the weather and providing weather forecasts/warnings, cyclone tracking over Indian Region, thunderstorm tracking and warning,

### 8. Research contributions

Contributed about 25 research papers in peer reviewed national and international journals, primarily in areas of climatology and rainfall/thunderstorm prediction. I coordinated established the first 'Metropolitan Weather Information and Forecast System' of India presently working in New Delhi. A meso-network of automatic weather stations was established; and an integrated forecast system from nowcast to medium range forecasts making use of dense observations, radar, satellite and NWP models was put in place. Presently involved in R & D projects on improving weather forecasts making use of various observational tools.

Place: New Delhi  
Date: 30.01.2013

(S C Bhan)  
Scientist-E