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Journey of MAUSAM during last seven decades (1950-2019)

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सार - स्वतंत्रता प्राप्ति के तुरंत बाद 1950 में भारत मौसम विज्ञान विभाग ने डॉ. एस. के. बनर्जी, महानिदेशक के समयकाल में एक त्रैमासिक वैज्ञानिक जर्नल "भारतीय मौसम विज्ञान और भू भौतिकी जर्नल" निकाला। इसके जरिए भारत में मौसम विज्ञान और संबद्ध विषयों के शोध पत्र प्रकाशित हुए। यही जर्नल अब "मौसम" के नाम से जाना जाता है जिसने 2019 में अपने सत्तर वर्ष पूरे किए हैं। यह भी उल्लेखनीय है कि डॉ. पी. के. दास का संख्यात्मक मौसम पूर्वानुमान पर पहला शोध पत्र 1958 में मौसम में प्रकाशित हुआ। सर्वश्रेष्ठ शोध पत्र को प्रोत्साहित करने के लिए द्विवार्षिक मौसम पुरस्कार (पुरस्कार स्वर्ण पदक या नकद पुरस्कार स्वरूप) जो पहले इंडियन जर्नल ऑफ मिटीओरोलॉजी एंड फिजिक्स (IJMG) पुरस्कार के नाम से जाना जाता था 1960 से आरंभ किया गया जो दो वर्ष में एक बार प्रकाशित हुए सर्वश्रेष्ठ शोध पत्र को दिया जाता है। इस जर्नल में उभरते महत्वपूर्ण विशेष विषयों से जुड़े विशेषांक भी निकाले जाते हैं और वर्ष 2018 तक इसके 17 विशेषांक निकाले जा चुके हैं। इस वर्ष "मौसम" पत्रिका अपने प्रकाशन के 70 वर्ष पूरे कर रही है और इस अवसर पर भारत मौसम विज्ञान विभाग "मौसम का गौरवशाली सत्तर वर्ष" मना रहा है और चार विशेषांक (Vol. 70, No.1-4) निकाल रहा है जिसमें पृथ्वी और वायुमंडलीय विज्ञान के क्षेत्र के जाने माने विशेषज्ञों के समीक्षा लेखों को समाहित किया गया है। इस लेख में "मौसम" पत्रिका के 70 वर्षों (1950-2019) की यात्रा के बारे में बताया गया है।

ABSTRACT. Soon after Independence, India Meteorological Department during the tenure of Dr. S. K. Banarji as Director General, launched a quarterly scientific journal "Indian Journal of Meteorology & Geophysics" in 1950 to provide medium for publication of meteorological and allied research in India. The journal now known as "Mausam" has completed seventy years of its publication in 2019. It is also to be noted that the first paper on Numerical Weather Prediction in India was published in "Mausam" in the year 1958 by Dr. P. K. Das. To encourage best research work a Biennial Mausam Award (prize in form Gold medal or cash) for best research paper published in every two years was started with effect from 1960 initially with name Indian Journal of Meteorology and Geophysics (IJMG) awards. The Journal also publishes special issues on selected topics of emerging importance and so far 17 issues have been published up to 2018. This year, "Mausam" journal is completing 70 years of its publication and on this occasion IMD is celebrating "Glorious Seventy Years of Mausam" and brought out the four special issues (Vol. 70, No. 1-4) by incorporating review articles from distinguished experts in emerging areas of Earth and Atmospheric Sciences. The article traces the journey of the Journal "Mausam" over last seventy years (1950-2019) of its publication.

Key words - Mausam, Biennial award, Impact factor.

1. Introduction

Way back in 1875, the time when India Meteorological Department (IMD) was established, the science of meteorology was in its infancy not only in India but also in other parts of the world. H. F. Blanford, who became the first head of IMD, had written a book in 1870's entitled 'Indian Meteorologists, Vade Mecum' which is considered as the first book on Tropical Meteorology. Blanford, on taking charge of IMD, had emphasized the dissemination of knowledge on the Meteorology of India, which was to be carried out by the officials of the department, amongst the administrators, government officials and general public as one of the primary functions of the department. He set up the publication of Memoirs of India Meteorological Department in 1880 as a departmental publication which was to serve as a medium for the publication of research carried out by the officials of the department. Blanford, besides publishing papers in the publications of the Royal Society, London, authored several papers which appeared in the Memoirs of IMD. His famous contribution on the 'Rainfall of India' was a monumental work, which appeared as Volume III of the Memoir series. In fact the beginning of the issuance of long-range monsoon rainfall forecast by relating the performance of the monsoon to the ensuing winter and spring seasons snowfall over Himalayas was made in 1884 by Blanford. He had promoted the publication of the series of Memoirs of IMD, in which many path breaking researches by the members of the IMD were published. The series continued up to 1950. John Eliot, who succeeded Blanford as the second head of IMD, also wrote many important papers on tropical cyclones, monsoon depressions and monsoon processes which appeared in different volumes of the memoirs. Even after his retirement in 1903, Eliot supervised the publication of the first Climatological Atlas of India, which appeared in 1907.

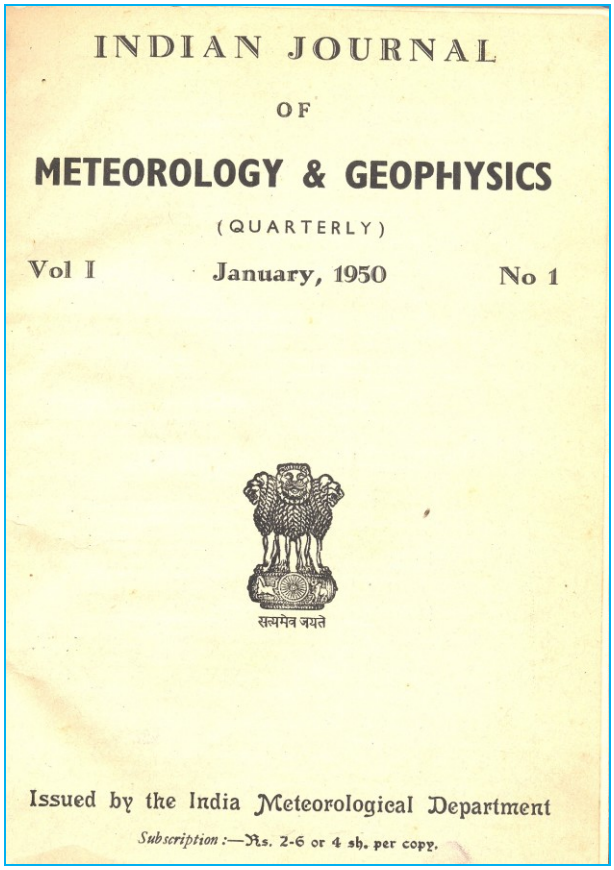


Fig. 1. Title cover of "Indian Journal of Meteorology and Geophysics, in 1950 (Vol. 1, No.1)

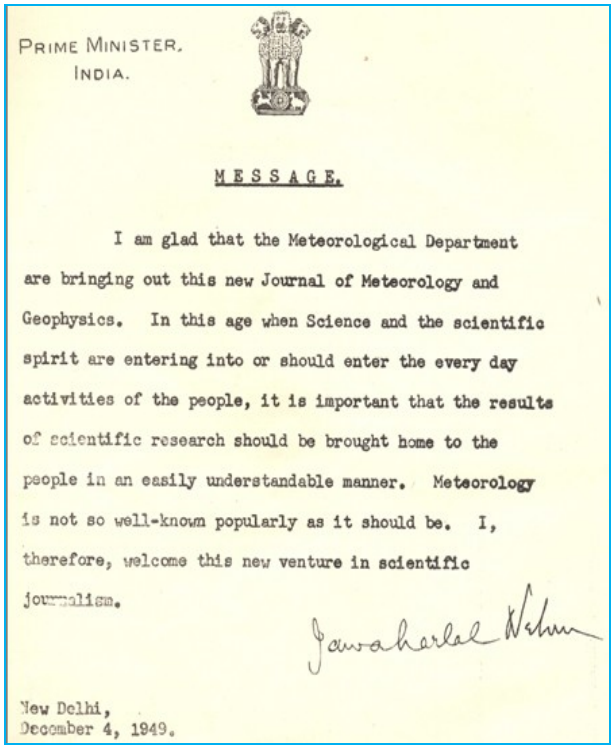


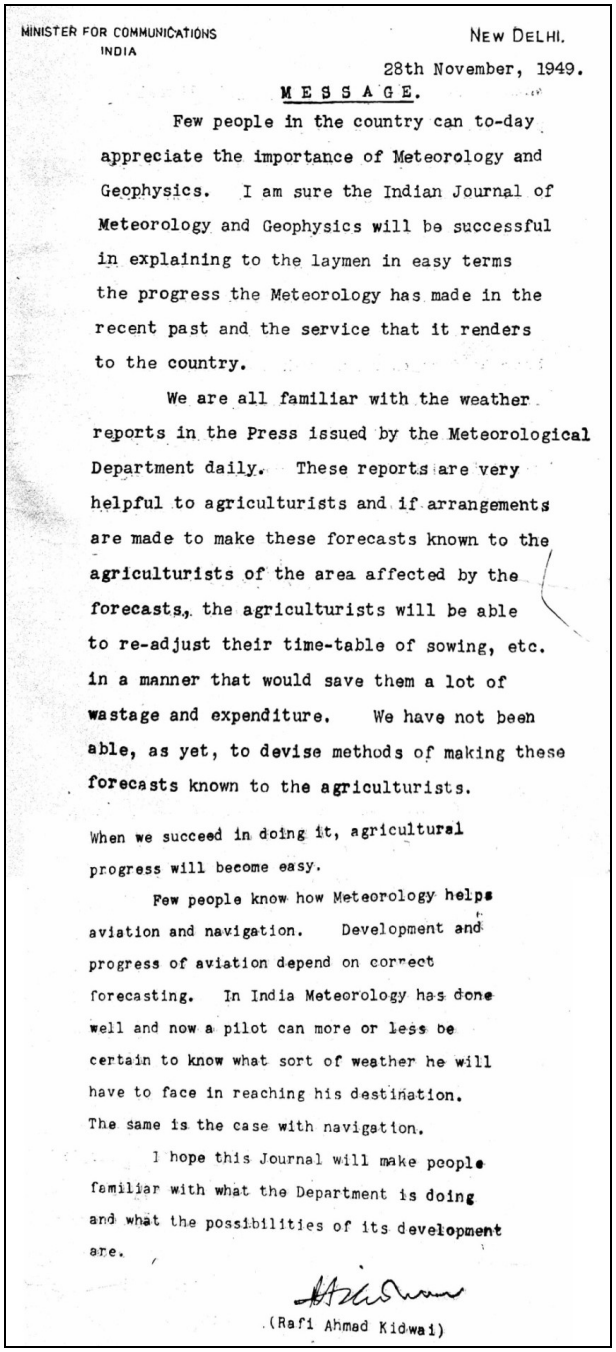
Fig. 2. Message given by Pt. Jawahar Lal Nehru, the First Prime Minister of Independent India on the release of first Volume of the Journal

Sir Gilbert Walker functioned as the third Head of the IMD from 1904 to 1924 and did pioneer work in monsoon research. He not only discovered important centres of action on global weather and climate but also placed long-range monsoon forecasting on firm statistical grounds linking summer monsoon rainfall performance over India with global atmospheric features. He also favoured in the Indianization of the IMD soon after the First World War. As the department grew in strength and the research output of its officers increased, IMD added two more formal research publications in the form of Scientific Notes and Technical Notes which continued again till about 1950.

The Departmental publications, in the form of Memoirs, Scientific Notes and Technical Notes, were the mainstay of publication of research done in IMD till 1950. A rapid growth in literature on the subject necessitated introduction of a regular peer reviewed research journal. Consequently, the first Indian Director General of Observatories, Dr. S. K. Banerji, was responsible for introducing publication of quarterly peer - reviewed scientific journal "Indian Journal of Meteorology & Geophysics", in January 1950 (Fig. 1), which is now known as Mausam. The event was a path breaking one for Indian Meteorology and allied disciplines. Pandit Jawaharlal Nehru, India's first Prime Minister, provided a message for the first issue of the Journal (Fig. 2). The first volume also contains the messages from Shri Rafi Ahmed Khan, Honourable, Minister of Communications, Government of India (The then nodal ministry of IMD) and from Dr. S. S. Bhatnagar, Secretary, Department of Scientific Research [Figs. 3(a&b)]. The Journal name was finally changed as 'Mausam' in 1979.

The first article published in the journal by the Director General Dr. S. K. Banerji was on the "Methods of foreshadowing monsoon and winter rainfall in India" is very interesting. Though IMD had started official monsoon forecast in 1886 and attempts have been made each year since then to foreshadow the rainfall of the coming season, this article was intended to explain briefly and simply the methods used in long-range forecasting, the scope of the forecasts issued and also the degree of their reliability, so that the public may have a clearer ideas as to how the forecasts are to be interpreted and to what extent they can be depended upon.

As shown in this article the estimated winter rainfall departure over northwest India during twenty eight years



MINISTER FOR COMMUNICATIONS
INDIA

NEW DELHI.

28th November, 1949.

MESSAGE.

Few people in the country can to-day appreciate the importance of Meteorology and Geophysics. I am sure the Indian Journal of Meteorology and Geophysics will be successful in explaining to the laymen in easy terms the progress the Meteorology has made in the recent past and the service that it renders to the country.

We are all familiar with the weather reports in the Press issued by the Meteorological Department daily. These reports are very helpful to agriculturists and if arrangements are made to make these forecasts known to the agriculturists of the area affected by the forecasts, the agriculturists will be able to re-adjust their time-table of sowing, etc. in a manner that would save them a lot of wastage and expenditure. We have not been able, as yet, to devise methods of making these forecasts known to the agriculturists.

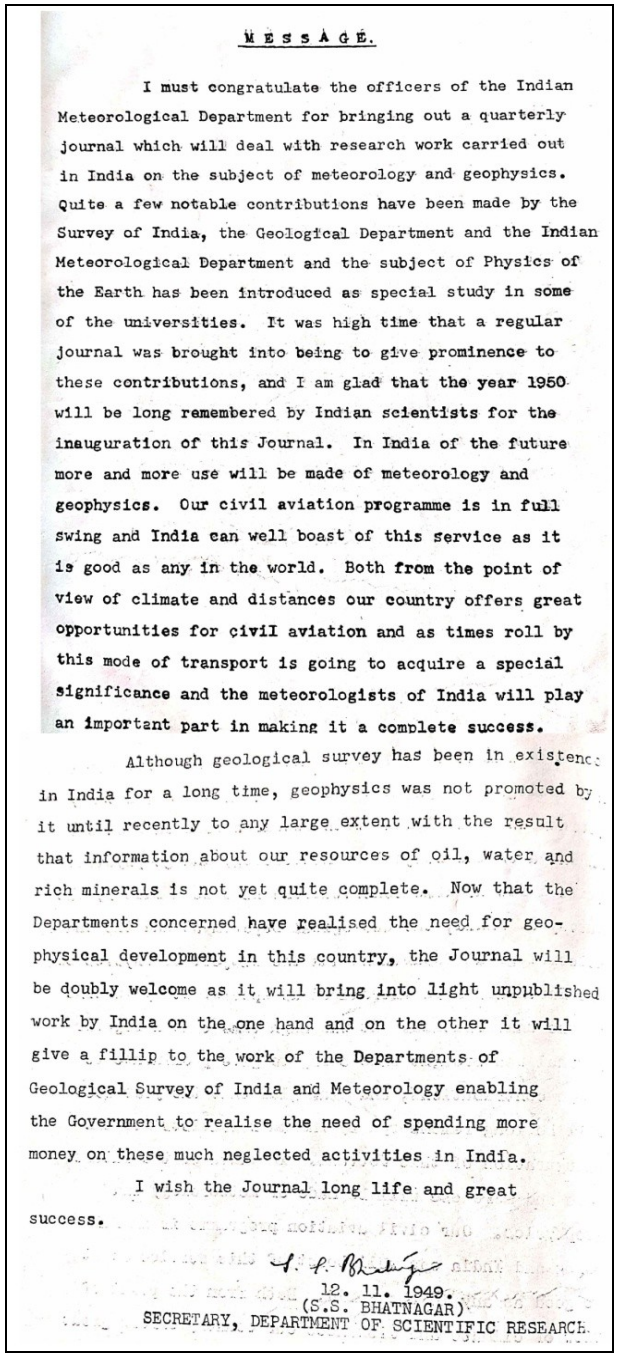
When we succeed in doing it, agricultural progress will become easy.

Few people know how Meteorology helps aviation and navigation. Development and progress of aviation depend on correct forecasting. In India Meteorology has done well and now a pilot can more or less be certain to know what sort of weather he will have to face in reaching his destination. The same is the case with navigation.

I hope this Journal will make people familiar with what the Department is doing and what the possibilities of its development are.

(Rafi Ahmad Kidwai)

Fig. 3(a). Message from Honourable Minister, Shri Rafi Ahmad Kidwai



MESSAGE.

I must congratulate the officers of the Indian Meteorological Department for bringing out a quarterly journal which will deal with research work carried out in India on the subject of meteorology and geophysics. Quite a few notable contributions have been made by the Survey of India, the Geological Department and the Indian Meteorological Department and the subject of Physics of the Earth has been introduced as special study in some of the universities. It was high time that a regular journal was brought into being to give prominence to these contributions, and I am glad that the year 1950 will be long remembered by Indian scientists for the inauguration of this Journal. In India of the future more and more use will be made of meteorology and geophysics. Our civil aviation programme is in full swing and India can well boast of this service as it is good as any in the world. Both from the point of view of climate and distances our country offers great opportunities for civil aviation and as times roll by this mode of transport is going to acquire a special significance and the meteorologists of India will play an important part in making it a complete success.

Although geological survey has been in existence in India for a long time, geophysics was not promoted by it until recently to any large extent with the result that information about our resources of oil, water and rich minerals is not yet quite complete. Now that the Departments concerned have realised the need for geo-physical development in this country, the Journal will be doubly welcome as it will bring into light unpublished work by India on the one hand and on the other it will give a fillip to the work of the Departments of Geological Survey of India and Meteorology enabling the Government to realise the need of spending more money on these much neglected activities in India.

I wish the Journal long life and great success.

12. 11. 1949.

(S.S. BHATNAGAR)
SECRETARY, DEPARTMENT OF SCIENTIFIC RESEARCH

Fig. 3(b). Message from the Secretary, Department of Scientific Research

from 1919 to 1946 based on the regression equations along with observed rainfall departure is shown in Fig. 4. The calculated rainfall gave correct indication of trend of observed rainfall & the difference is found to be small during many years.

This year (2019) the Journal "Mausam" has now completed its 70th year of publishing in the fields of Meteorology, Geophysics, Hydrology, Seismology and other allied subjects and is among the well known scientific journals in India as well as abroad. Besides papers in atmospheric sciences and allied disciplines, each issue of the Journal carries a synopsis of the weather of India during a season of India which is informative for researchers, administrators and lay public. The content

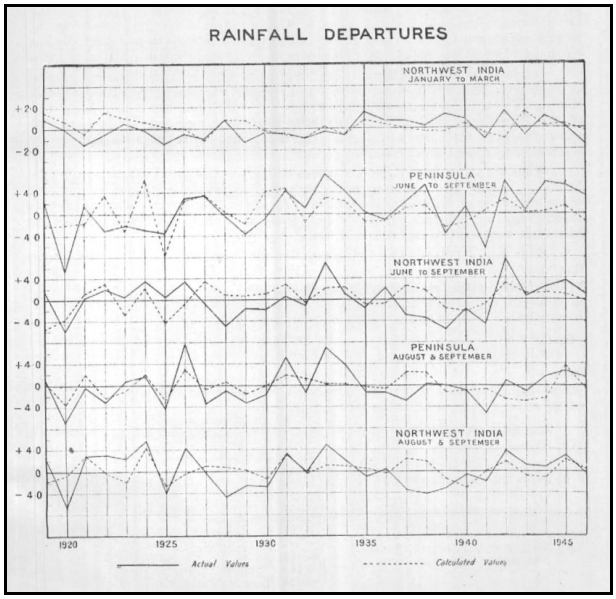


Fig. 4. Calculated winter rainfall departure over Northwest India along with observed rainfall during the period from 1919 to 1946 (S. K. Banerji, Mausam, 1950; Vol. 1, No. 1).

of the Journal includes articles, full papers, short contributions, letters to the Editor. The Journal has an Editorial Board of eminent meteorologists from India and abroad with Director General of Meteorology heading the Board as Chief Editor in ex-officio capacity. The Journal is serving as a vehicle of research publication on meteorology and allied subjects from scientists of South Asian countries and even at times from other countries too. The Journal provides a much desired opportunity for scientists of the IMD, who are scattered all along India and working at stations with not too good research facilities, to take interest in problems of local operational interests and communicate their research for publication in "Mausam". This is much desired objective and ought to be followed in future too as it provides the stimulus to carry out research at outstations, which is of regional or even of all India relevance.

2. Change in the name of the Journal

The first issue of the journal "Indian Journal of Meteorology & Geophysics" made its appearance in January 1950. This name of the journal was continued for 25 years till release of Vol. 25 (1974). In this intervening period occurrence of frequent droughts in the country and elsewhere triggered investigations in hydrology as a down-stream application area of meteorology. Papers in Hydrology were regularly accepted by the Journal prompting addition of the term Hydrology in the name of the Journal. Thus, Vol. 26 (1975) was released with new name Indian Journal of Meteorology, Hydrology & Geophysics (Fig. 5).

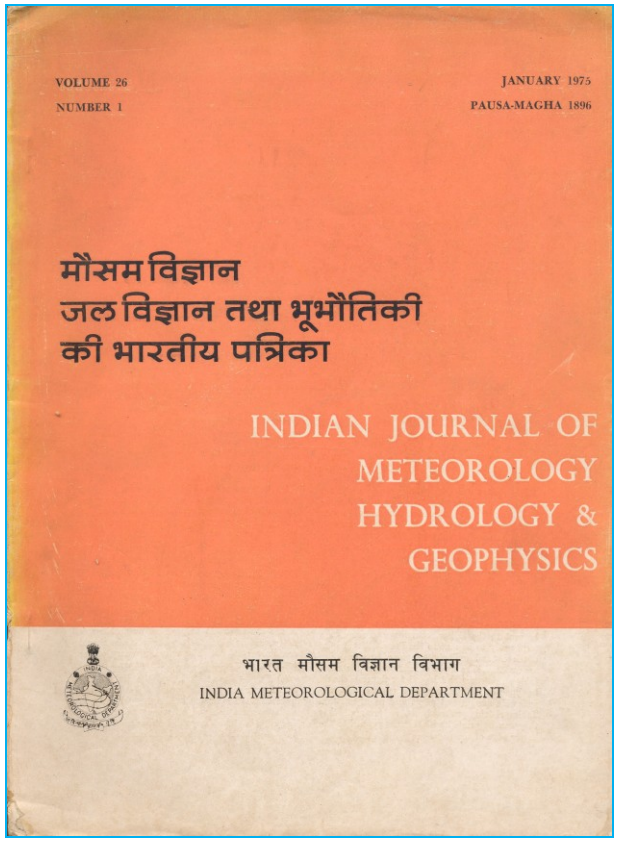


Fig. 5. The title cover of the journal after getting its new name "Indian Journal of Meteorology, Hydrology and Geophysics" in 1975 (Vol. 26 No.1)

Another five years down the line the Board of Editors realized that the name of a journal need not be a de facto catalogue of terms of its subject contents and that it is perhaps appropriate to choose a symbolic name for it. The present name "MAUSAM**"** came to be accepted from Vol. 30, (1979) (Fig. 6). Mausam is the Indian word for weather and thus the name symbolizes the weather of India.

3. Biennial Mausam Awards

3.1. *IJMG / MAUSAM Award*

To promote quality research publications in the Journal, the idea of institution of a Prize or a medal for the best paper in the Indian Journal of Meteorology and Geophysics was taken up. On the first World Meteorological Day, celebration on 23rd March, 1961, the then Minister of Transport & Communication.

Dr. Subbarayan announced the decision of the Government of India to institute a IJMG Award (Cash prize or Gold medal worth Rs. 500/-) for best research paper published in every two years. The first judging

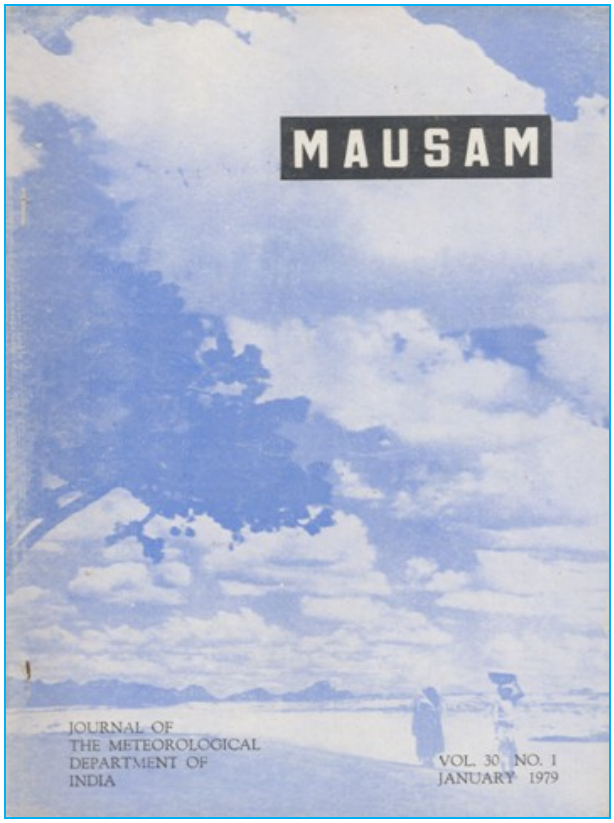


Fig. 6. Title cover of the journal with its present name "MAUSAM" in 1979 (Vol. 30, No.1)

committee members were Prof. S. Petterson, Prof. Sydney Chapman, Sir G. Sutton, Dr. K. R. Ramanathan and Shri P. R. Krishna Rao. The honour of receiving the first award for the biennial period 1960-1961 was given to Dr. M. V. Sivaramakrishnan for his paper on "The relation between raindrop size distribution, rate of rainfall and electrical charges carried down by rain in the tropics". In this series of biennial awards, 29 awards have been given so far either in form of Gold medal or in cash alongwith a citation. The other distinguished recipients of these awards include were M. S. V. Rao, P. K. Das, H. M. Chaudhury, R. V. Godbole and R. R. Kelkar, J. S. Sastry and R. S. D'Souza, B. V. Singh and R. K. Datta, V. Srinivasan and V. Sadasivan, S. K. Ghosh, R. K. Dube and S. N. Chatterjee, S. D. S. Abbi, A. K. Gosain and (Mrs.) P. Narayanan, U. C. Mohanty, S. K. Dube and P. C. Sinha, S. Rajamani, (Mrs.) P. S. Salvekar and S. K. Mishra, J. C. Mandal, Chandrasekhara R. Kondragunta, Y. C. Sud, K. M. Lau, G. K. Walker and J. H. Kim, Mukut B. Mathur, M. Rajeevan, David Bachiochi, Bhaskar Jha and T.N. Krishnamurti., R. Suresh and S. Rengarajan, Heiko Paeth and Jochen Stuck. The 24th Biennial Mausam Award for the period 2006-2007 was awarded to Dr. Somenath Dutta and 2008-2009 award was given to the paper authered by Dr. M. Mohapatra, Shri H. R. Biswas

Fig. 7. Dr. M. Mohapatra receiving the 25th Biennial Mausam Award from the then Hon'ble minister Dr. Ashwini Kumar

and Shri G. K. Sawaisarje so on. List of awardees and papers are given in Table 1. Initially this award consisted of a gold medal worth of Rs. 500/- and a citation. It has now been raised to a cash prize of Rs. 50,000/- (Rs. Fifty Thousand only) to be shared by all authors and a citation. The thought behind the Biennial Mausam Award was to encourage and to motivate research scientists to contribute high quality original research papers. This is to upgrade quality of "Mausam" so that it comes at par with contemporary International Journals in the field of Atmospheric Sciences. The 25th Biennial Mausam Award for the period (2008-2009) being received by Dr. M. Mohapatra, the first author of the paper entitled "Daily summer monsoon rainfall over northeast India due to synoptic scale systems" from Dr. Ashwani Kumar, the then Hon'ble Minister in presence of Dr. Shailesh Nayak, the then Secretary, MoES, AVM (Dr.) Ajit Tyagi, Ex. DG, IMD, Prof. Yashpal, Eminent scientist & Educationist (Fig. 7).

4. Highlights of some important papers in Mausam

During last seventy years there are many classical papers in the fields of Meteorology, Geophysics, Hydrology, Seismology, Numerical Weather Prediction (NWP), Monsoon Meteorology etc have been published in Mausam. In India, a beginning on NWP was made towards the development of numerical methods for weather predication in the late fifties with a classic paper entitled "Numerical prediction of the movement of Bay depressions" by P. K. Das and B. L. Bose (Das and Bose, 1958), published in Indian Journal of Meteorology and Geophysics. In that paper they tested displacement of monsoon depressions based on non-divergent barotropic model of Charney and Estoque's baroclinic model. Later, very important findings published by P. K. Das (1964) on Baroclinic properties waves behind a large circulation mountain got the 3rd Mausam Award. With this landmark effort, the early and mid-1970s witnessed significant developments in Objective Analysis of meteorological observations - which is a crucial component of numerical

weather prediction (NWP). In order to improve the forecast of storm surges associated with tropical cyclone, S. K. Ghosh (1977) developed a nonograms to estimate peak surges generated by tropical cyclone and the paper published in 1977 was awarded with 9th Mausam Award.

The advances in Numerical Weather Prediction (NWP) in the last decade have been tremendous: higher accuracy, higher resolution, longer Lead time, wider range of relevant applications. Consequently the emphasis in operational meteorology, hydrology, oceanography and climatology has shifted towards the implementation of increasingly sophisticated and diverse numerical models and applications, for an ever-increasing variety of users. Many research papers are published in Mausam using the latest HPCS. The paper by Surya Kanti Dutta, V. S. Prasad and D. Rajan (2014) published in Mausam on "Impact study of integrated precipitable water estimated from Indian GPS measurements" was adjudicated the best paper for 28th Mausam Award. In this paper the Integrated Precipitable Water (IPW) data from Indian stations namely Chennai, Guwahati, Kolkota, Mumbai and New Delhi have been assimilated in the National Centre for Medium Range Weather Forecasting's (NCMRWF) Global data Assimilation System (GDAS). Forecasts vs. analyses study shows positive impact of IPW assimilation on the anomaly and pattern correlations.

India's climate is dominated by monsoons. The summer monsoons roar onto the subcontinent from the southwest. The winds carry moisture from the Indian Ocean and bring heavy rains from June to September. The monsoon winds blow from the northeast and carry little moisture. Many Indian scientists have done land mark work on Indian monsoon. During 1950s, Koteswaram and his collaborators (1950, 1958) made pioneering contributions in the study of monsoon structure and the formation of monsoon disturbances over the Bay of Bengal. Pisharoty and Asnani (1957) reported their work on preferential distribution of heavy rainfall in south sector of a monsoon depression from dynamical point of view. Another important contribution during 1950s was made by George (1956), which dealt with the effects of off-shore vortices on the monsoon rainfall along the west coast of India. During 1960s, Rao (1962) reported his work on meridional circulation associated with Indian summer monsoon. The work of Joseph and Raman (1966) on the Low Level Jet (LLJ) over Peninsular India during July led to the discovery of an important component of summer monsoon. Krishna Rao and Jagannathan (1951) studied Northeast monsoon rainfall of Tamil Nadu by using the 80 (1870-1949) year's rainfall data.

Considering the socio-economic importance of tropical cyclone (TC) disasters, there are a large number of research contributions published in the journal, Mausam with respect to genesis, intensification, structure, movement and landfall of TC and associated adverse weather like heavy rain, strong wind and storm surge. With respect to genesis and intensification, Desai and Rao (1954) and Desai (1967) looked for the interplay of different air masses along inter-tropical convergence zone for intensification of a low into a matured TC. According to Koteswaram and Gaspar (1956), asymmetry in near surface distribution is characteristics of TCs over the NIO, which was endorsed by Raj *et al.* (2007).

Like monsoon, cyclone, NWP the journal also witnessed many important publications on long range forecasting, agrometeorology, climatology, satellite meteorology, radar meteorology, hydrometeorology during last seventy years.

5. Publishing & Printing of the Journal

In the beginning, the responsibility of publication of the 'Indian Journal of Meteorology and Geophysics', was with the Controller of Publications, New Delhi. The job of printing of the Journal was assigned to a Government of India Press by the Controller of Publications, New Delhi. For maximum life span of the Journal, it was printed at Govt. of India Press. With a view to improve the print quality and avoid delay in the publication of the Journal, the responsibility of the publication of the Journal, which had by then got its new name 'MAUSAM', was taken over by the India Meteorological Department from the Controller of Publications, New Delhi, in 1997. Thus under the new arrangement from the year 1997, Mausam (Vol. 48), the printing job of 'MAUSAM' was assigned to National Institute of Science Communication (NISCOM), now known as National Institute of Science Communication and Information Resources (NISCAR) which is an autonomous body of the Council of Scientific and Industrial Research (CSIR), New Delhi. At present offset color printing technology with photographs in color, is used for printing Mausam, using good quality paper (Fig. 8). The print quality of the Journal has improved considerably over a period of time.

6. Impact Factor of Mausam and its Citation Indexing

Impact Factor (IF) is one of the quantitative tools for ranking or evaluating a scientific journal. It is also a measure of frequency with which the "average article" in a journal has been cited in particular year or period. User's knowledge of content and history of the journal is very important for appropriate interpretation of impact factor. Mausam has been assigned its impact factor in India from

TABLE 1

List of Biennial IJMG/IJMHG/MAUSAM Award Recipients

S. No.	Award No. & (Biennial Period)	Recipients Name	Paper title	Published in Vol., No./ Issue No./Page No.
1.	First Award (1960-61)	M. V. Sivaramakrishnan	The relation between raindrop size distribution, rate of rainfall and the electrical charge carried down by rain in the tropics	(IJM&G, 1960, **11**, 3, pp 258-268)
2.	Second Award (1962-63)	M. S. V. Rao	Mean Meridional air-motion and associated transport processes in the atmosphere	(IJM&G, 1963, **14**, 2, pp 117-142)
3.	Third Award (1964-65)	P. K. Das	Lee waves associated with a large circular mountain	(IJM&G, 1964, **15**, 4, pp 547-554)
4.	Fourth Award (1966-67)	H. M. Chaudhury	Seismic surface wave dispersion and the crust across the Gangetic basin	(IJM&G, 1966, **17**, 3, pp 385-394)
5.	Fifth Award (1968-69)	R. V. Godbole and R. R. Kelkar	Net Terrestrial Radiative Heat Fluxes over India during Monsoon	(IJM&G, 1969, **20**, 1, pp 1-10)
6.	Sixth Award (1970-71)	J. S. Sastry and R. S. D'Souza	Oceanography of the Arabian Sea during the southwest monsoon season Part I : Thermal structure	(IJM&G, 1970, **21**, 3, pp 367-382)
		J. S. Sastry and R. S. D'Souza	Oceanography of the Arabian Sea during the southwest monsoon season Part II : Stratification and circulation	(IJM&G, 1971, **22**, 1, pp 23-24)
7.	Seventh Award (1972-73)	B. V. Singh and R. K. Datta	A scheme for multi-level objective analysis of contour heights	(IJM&G, 1973, **24**, 2, pp 101-108)
8.	Eighth Award (1974-75)	V. Srinivasan and V. Sadasivan	Thermodynamic structure of the atmosphere over India during southwest monsoon season	(IJM&G, 1975, **26**, 2, pp 169-180)
9.	Ninth Award (1976-77)	S. K. Ghosh	Prediction of storm surges on the east coast of India	(IJM&G, 1977, **28**, 2. pp 157-168)
10.	Tenth Award (1978-79)	R. K. Dube and S. N. Chatterjeee	The crustal structure of the Hindukush region	(IJMH&G, 1978, **29**, 3, pp 481-486)
11.	Eleventh Award (1980-81)	S. D. S. Abbi, A. K. Gosain and (Mrs.) P. Narayanan	Application of deterministic conceptual model for water balance studies	(Mausam, 1980, **31**, 2, pp 191-200)
12.	Twelfth Award (1982-83)	U. C. Mohanty, S. K. Dube and P. C. Sinha	On the role of large scale energetics in the onset and maintenance of summer monsoon - I : Heat Budget	(Mausam, 1982, **33**, 2, pp 139-152)
		U. C. Mohanty, S. K. Dube and P. C. Sinha	On the role of large scale energetics in the onset and maintenance of summer monsoon - II : Moisture Budget	(Mausam, 1982, **33**, 3, pp 285-294)
13.	Thirteenth Award (1984-85)	S. Rajamani	Energetics of the monsoon circulation over south Asia - I : Diabatic heating and the generation of available potential energy	(Mausam, 1985, **36**, 1, pp 7-12)
		S. Rajamani	Energetics of the monsoon circulation over south Asia - II : Energy terms and energy transformation terms	(Mausam, 1985, **36**, 4, pp 405-412)
14.	Fourteenth Award (1986-87)	(Mrs.) P. S. Salvekar and S. K. Mishra	Effect of Ekman boundary layer friction on the baroclinic growth of monsoon depression	(Mausam, 1986, **37**, 2, pp 147-152)
15.	Fifteenth Award (1988-89)	J. C. Mandal	A model of tropical storm from temperature anomaly distributions	(Mausam, 1988, **39**,4, pp 367-374
16.	Sixteenth Award (1990-91)	Chandrasekhara R. Kondragunta	On the intra seasonal variations of the Asiatic summer monsoon	(Mausam 1990, **41**, 1, pp 11-20)
17.	Seventeenth Award (1992-93)	J. C. Mandal	Numerical simulation of a tropical storm boundary layer	(Mausam, 1992, **43**, 3, pp 259-268)
18.	Eighteenth Award (1994-95)	Y. C. Sud, K. M. Lau, G. K. Walker and J. H. Kim	Understanding biosphere - precipitation relationships: Theory, model simulations and logical inferences	(Mausam, 1995, **46**, 1, pp 1-14)
19.	Nineteenth Award (1996-97)	Mukut B. Mathur	Impact of parameterized convection on a numerically simulated tropical cyclone structure	(Mausam, 1997, **48**, 2, pp 135-156)
20.	Twentieth Award (1998-99)	M. Rajeevan	Aerosol - cloud - climate effect : Study with a radiative transfer model	(Mausam, 1998, **49**, 2, pp 195-202)
21.	Twenty-first Award (2000-2001)	David Bachiochi, Bhaskar Jha and T. N. Krishnamurti	The effect of Indian Ocean Warming on the Indian monsoon : An atmospheric model study	(Mausam, 2001, **52**, 1, pp 151-162)
22.	Twenty-second Award (2002-2003)	R. Suresh and S. Rengarajan	On forecasting cyclone movement using TOVS data	(Mausam, 2002, **53**, 2, pp 215-224)

TABLE 1 (*Contd.*)

S. No.	Award No. & (Biennial Period)	Recipients Name	Paper title	Published in Vol., No./ Issue No./Page No.
23.	Twenty-third Award (2004-2005)	Heiko Paeth and Jochen Stuck	The West African dipole in rainfall and its forcing mechanisms in global and regional climate models	(Mausam, 2004, **55**, 4, pp 561-582)
24.	Twenty-fourth Award (2006-2007)	Somenath Dutta	Parameterization of momentum flux and energy flux associated with orographically excited internal gravity waves in a baroclinic background flow	(Mausam, 2007, **58**, 4, pp 459-470)
25.	Twenty-fifth Award (2008-2009)	M. Mohapatra, H. R. Biswas and G. K. Sawaisarje	Daily summer monsoon rainfall over northeast India due to synoptic scale systems	(Mausam, 2008, **59**, 1, pp 35-50)
26.	Twenty-sixth Award (2010-2011)	A. K. Jaswal	Changes in total cloud cover over India based upon 1961-2007 surface observations	(Mausam, 2010, **61**, 4, pp 455-468)
27.	Twenty-seventh Award (2012-2013)	Kuldeep Srivastava, Sharon S. Y. Lau, H. Y. Yeung, T. L. Cheng, Rashmi Bhardwaj, A. M. Kannan, S. K. Roy Bhowmik and Hari Singh	Use of SWIRLS Nowcasting System for Quantitative Precipitation Forecast Using Indian DWR Data	(Mausam, 2012, **63**, 1, pp 1-16)
28.	Twenty-eighth Award (2014-2015)	Surya Kanti Dutta, V. S. Prasad and D. Rajan	Impact study of integrated precipitable water estimated from Indian GPS measurements	(Mausam, 2014, **65**, 4, pp 461-480)
29.	Twenty-ninth Award (2016-2017)	S. P. Ghanekar, S. G. Narkhedkar and D. R. Sikka	Progress of Indian summer monsoon onset and convective episodes over Indo-Pacific region observed during 2009-2014	(Mausam, 2016, **67**, 4, pp 803-828)

the year 2005, which has shown some improvement in recent periods & reached to a value of about 0.4. However, efforts are on to further improve the IF of Mausam.

Mausam has strived hard to maintain high quality of its scientific content and has grown in popularity in India and abroad. The journal has published research papers for 70 years and being the pioneer journal from this part of the world dealing with Atmospheric Sciences and allied subjects. About 5000 research papers have been published in Mausam in last 70 years.

"MAUSAM" was selected in 2007 for coverage in the Science Citation Index Expanded (SCIE). The indexing of this title "MAUSAM" has started since 2007. Thomson Scientific Publication Processing, U.S.A. has also informed that "MAUSAM" has been selected for coverage in Thomson Reuter's products and custom information services. From Vol. 58 (2007) onwards "MAUSAM" is being indexed and abstracted in the (*i*) Science Citation Index Expanded (SCIE) and (*ii*) Journal Citation Reports/Science Edition which has enhanced its visibility among scientific journals.

7. Publication of Special Issues

As meteorology was expanding and covering ever growing areas of atmospheric - ocean sciences, Mausam adopted a policy to issue Special Issues. Some early special issues were also devoted to printing Proceeding of symposia and conferences held in India. Of late Mausam started bringing out special issues on specific field. The list of special issues published so far is in Table 2. These special issues played a very important role subject area which contain articles from leading researchers in the emphasizing ongoing scientific programmes on meteorological and other environmental issues. The special issue of 2009 published on account of Diamond Jubilee (sixty years of Mausam) contained many scientific articles/research papers covering various disciplines from Monsoon studies to Climate Change as shown in Fig. 8(a). A two days symposium was organized on 17-18 December, 2009 at SCOPE Convention Centre, New Delhi to commemorate Diamond Jubilee of this quarterly publication The Diamond Jubilee issue of MAUSAM", was released by the then Hon'ble Minister of Earth Sciences, Shri Prithviraj Chavan [Fig. 8(b)]. On this occasion Dr. Ajit Tyagi, DGM, IMD said that the organization is on its way to improving the weather prediction by bringing in more technical advancements. IMD is working towards dissemination of information to end users. Dr. R. K. Kolli, representative from WMO presented the concept of Global Frame work for climate services.

The "contents of the Diamond Jubilee issue of MAUSAM" contained an article, "Journey of Mausam during last six decades" and eighteen research papers on various subjects, like, Numerical Weather Prediction, Climate Change, Monsoon Studies, Thunderstorm Studies, Environmental Meteorology, Radar Meteorology,

TABLE 2

SPECIAL ISSUES OF MAUSAM

S. No.	Special Issue Title	Years	Vol., No.
1.	Proceedings of the National Symposium (10-13 April 1970) on "Satellite Meteorology"	1971	Vol. 22, No. 3
2.	Papers presented at the Symposium (25-27 July 1973) on "Numerical Weather Prediction"	1975	Vol. 26, No. 3
3.	Proceeding of the Joint Symposium with American Meteorological Society (7 to 12 March 1977) on "Monsoons"	1978	Vol. 29, No. 1&2
4.	Proceedings of the Symposium (8-10 March 1978) on "Earthquake Prediction"	1979	Vol. 30, No. 2&3
5.	Papers presented at the Symposium (7 - 11 December 1981) on "Tropical Droughts"	1984	Vol. 35, No. 3
6.	Papers presented at International Symposium (23-28 November 1988) on "Monsoon Understanding and Prediction"	1990	Vol. 41, No. 2
7.	Special Issue on "Tropical Cyclones"	1997	Vol. 48, No. 2
8.	Special Issue on "Ocean Response to Tropical Cyclones"	1997	Vol. 48, No. 4
9.	Special Issue on "Climate Change"	2001	Vol. 52, No. 1
10.	Special Issue on "Remote sensing applications in Meteorology"	2003	Vol. 54, No. 1
11.	Special issue on "Arabian Sea Monsoon Experiments" (ARMEX)"	2005	Vol. 56, No. 1
12	Special Issue on "Orissa Super Cyclone of October 1999"	2006	Vol. 57, No.1
13.	Diamond Jubilee Volume 2009,	2009	Special Issue
14.	Special Issue on "Polar Science"	2011	Vol. 62, No.4
15.	Proceedings of National Conference on Bay of Bengal Tropical Cyclone Experiment "BOBTEX 2011"	2013	Vol. 64, No.1
16.	Special Issue on "Forecast Verification"	2015	Vol. 66, No.3
17.	Special Issue on "Extreme Weather Events and Indian Agriculture"	2016	Vol. 67, No.1
18.	Special issues on "Glorious Seventy Years of Mausam"	2019	Vol. 70, No.1-4

Satellite Meteorology, Antarctic Meteorology/Polar Meteorology, Oceanography, Seismology & Tsunami Studies.

Further, on account of seventy years of its publication of journal "MAUSAM" IMD has brought out four special issues of MAUSAM in 2019. The cover page of first issue of January in 2019 (Vol. 70, No. 1) is shown in Fig. 9.

The readers of MAUSAM now require a search engine to refer & search research papers of an author/ topic/ subject of their choice. Mausam would soon become an online e-Journal after coordinating through some publishers.

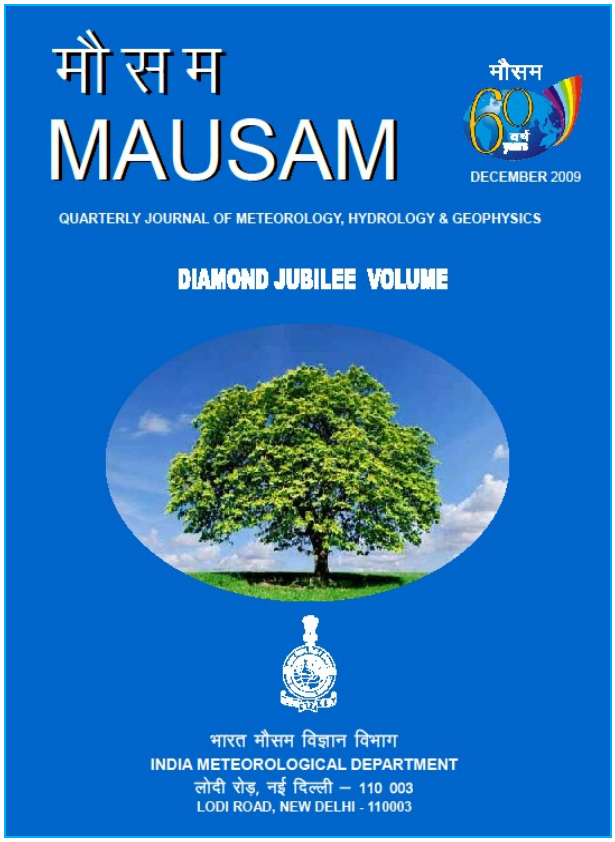


Fig. 8(a). Special Diamond Jubilee volume of Mausam (2009)

Fig. 8(b). Releasing of Diamond Jubilee issue of MAUSAM by the then Hon'ble Minister of Earth Sciences Shri Prithviraj Chavan

8. Future plan for improvement

Mausam has always been in the process of improving its overall quality including the quality of its contents since its very inception. As already mentioned the new technologies have been adopted from time to time in the publication of the Journal. Mausam has achieved a prestigious position among the journals on meteorological and atmospheric sciences published throughout the world. Again, it is not the end of the process since the Editorial Board has planned for further improvement in the quality of the Journal. The Editorial Board of 'Mausam' has, of late started holding meetings once or twice a year to lay

Fig. 9. The cover page of first issue of "MAUSAM" in 2019 (Vol. 70, No.1)

down broad policy for the Journal, which is followed as general guidance by its Editorial Office. The Editorial Office is in the process of becoming a paperless office. The office is going to acquire software like the Editorial Office Management System which would help in expediting publication of 'Mausam'. Efforts have been made to make the review process faster. All efforts are also being made to reduce the time gap between the submission of a research article and its publication in MAUSAM after review/assessment by the subject editors. 'Mausam' will continue to strive to enhance its presence amongst the scientific journals devoted to communication of research results in weather, climate and allied disciplines.

9. Online access of all issues of MAUSAM

On the occasion of seventy years of its celebration of Mausam in this year, all the issues of MAUSAM with effect from 1950 to till date have been uploaded on IMD website for the benefit of scientists, researchers, students, forecasters and planners in the field of Meteorology, Hydrology, Geophysics and Allied Sciences. These issues are available online in https://metnet.imd.gov.in/imdmausam/. In this regard, the then Director General of Meteorology, Dr. K. J. Ramesh has issued appreciation letters to the Executive Editor, Dr. D. R. Pattanaik, Scientist 'E' and the entire team of Editorial Office (Journal Branch).

10. Concluding remarks

Mausam has published several important papers on Weather and Climate of India. Monsoon prediction and variability, hydrometeorology and agricultural meteorology, advances in aviation meteorology, numerical weather prediction, tropical cyclones, climate change, radar meteorology, satellite meteorology etc. have remained its dominant fields of interest.

Mausam has now completed seventy years of publication and achieved a milestone. Over seven decades, it has served not only as an important scientific journal but as a channel of communication across domains dealing with weather and climate of South Asia; particularly India. MAUSAM has gone through various stages of improvement during its journey over the last six decades to meet international standards. It has also served as a vehicle to provide a sense of belongings amongst the members of the IMD and is providing them a stimulus for research. There is now a clear transition of its focus from observational based studies and their synoptic and empirical analysis to numerical modelling and simulation studies. Moreover the Journal receives papers on the practical implication of weather and climate related issues in India and their impacts on agriculture, water resources, power and aviation sectors etc. MAUSAM has maintained a social relevance as well as high quality of scientific content in the paper published in its issues. It has also served the objective of communicating the research output of the members of IMD to the Governmental officials, researchers and general public. All the research papers of the journal since its beginning in 1950 are made available online to the meteorological communities. We are hopeful that in years to come Mausam would continue to strive to enhance its standards in terms of quality of papers and maintain its presence in the scientific journals in the field of weather and climate related studies.