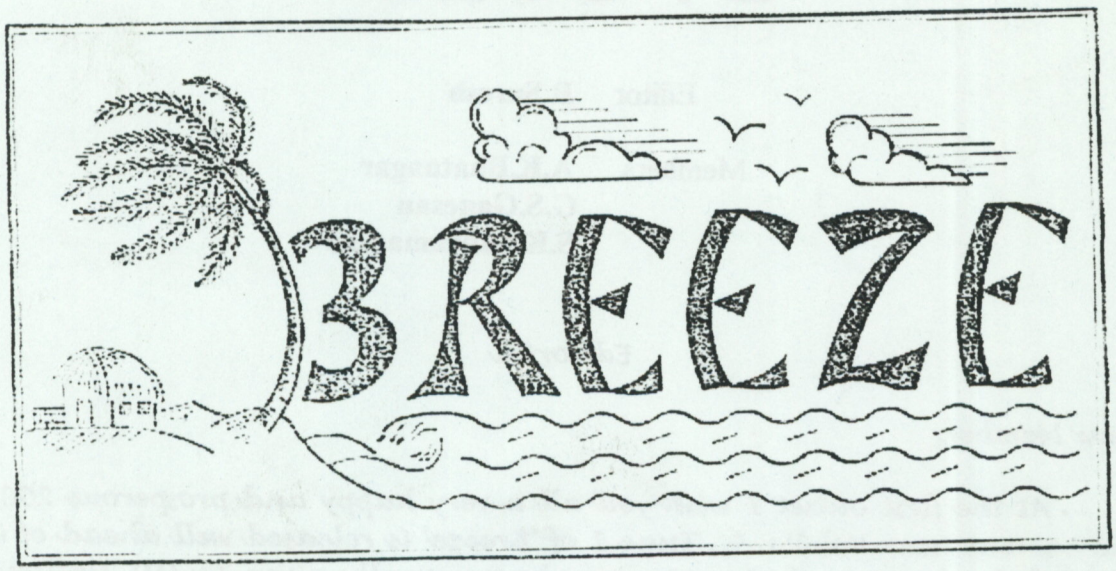

The news letter of Indian Meteorological Society, Chennai chapter

Vol 4 Issue 1 *January - June 2001*

Breeze

Editorial

Dear Member,

At the first outset I wish you all a very happy and prosperous 2001. The current issue Vol No. 4 , Issue 1 of 'Breeze' is released well ahead of its scheduled release so that copies can be personally given to IMS National council members and members of other chapters during ensuing TROPMET-2001 to be held at Mumbai during 6-9 February 2001. An extended abstract of a lecture on "IPCC findings on Climate Change" by Dr N.Sundararaman, Secretary, IPCC, Geneva has been included for the benefit of members who could not attend to his lecture on 2.1.2001. As you all aware, a half-day seminar on "Monsoons of 2000" was conducted in collaboration with Regional Meteorological Centre, Chennai on 22 January 2001. In this issue a summary of talk given by Shri S.K.Subramanian, Director, Area Cyclone warning Centre, Chennai has been included. This issue of Breeze can also be browsed at URL : www.geocities.com/imsmds.

Editor

Chennai
24.01.2001

The Editor and the Society are not responsible for the views expressed by the authors.

Status of the membership of IMS Chennai chapter as on 24.01.2001

Fellows	**01**
Life members	**52**
Annual members	**93**
Total	**146**

The IPCC findings on climate change

N. SUNDARARAMAN
Secretary, Inter-governmental Panel on Climate Change (IPCC), Geneva

If calculations are made of historical mean global surface temperatures since mid-nineteenth century upto the present, using coupled ocean atmosphere general circulation models which take into account only the observed solar variability and known volcanic eruptions, the calculations diverge from mean global surface temperatures calculated from available atmospheric observations. When past greenhouse gas (GHG) and sulphur emissions and stratospheric ozone changes are included in the same models, the model calculations and atmospheric data agree quite well, especially for the post-1970 period. This strengthens the 1995 IPCC conclusion, with respect to atmospheric data, that "the balance of evidence suggests a discernible human influence on global climate.

New emissions scenarios, which are projections into the future of GHG and sulphur emissions, have been made since 1992, which are based upon new socio-economic information, such as future population growth, GDP growth, technology advances and energy mixes. When these scenarios are input into the models, the calculated temperatures for the year 2100 range from about 1.5 to 6°C (the 1995 range was 1 to 3.5°C). This wide range is a result of the new emission projections, largely and further refinements of the OH-chemistry in the models.

If GHG emissions were to be restrained in a way that atmospheric concentrations of those gases are stabilized, temperatures projected into the future continue to rise for a few centuries after the date of stabilization. Sea level rise continues for a few centuries (to as much as a millennium) after temperature change stabilises. This and the long residence time of CO_2 give rise to the sense of urgency about reducing GHG emissions.

The consequences of increasing temperatures accompanying changes in precipitation are expected to be greater frequency floods in some parts of the world and greater frequency of droughts in some other parts of the world, particularly those that are currently drought-prone. The seasonality of run-offs could also change. While this situation is not expected to change the overall global food production, its regional distribution is expected to be affected.

The incidence of vector-borne and infectious diseases is expected to increase and human health may be adversely affected for climate and water and food reasons. Ecosystems appear vulnerable to global warming that is projected by models to occur at a rate several times faster than that seen in the last 10,000 years. Improvements in the efficiency of the generation, distribution and end-use of energy and different mixes of energy sources(that include renewable and alternative sources) appear to be cost-effective ways of meeting the energy needs of the future without encountering a large warming.

These are some of the reasons for the current national and international concerns with respect to anthropogenic climate change.

Mercurial Scales of Meteorology

(After acknowledging the significant roles of barometers and thermometers)

G.S.GANESAN

" I often say that when you can measure what you are speaking about and express it in numbers, you know something about it; but when you cannot express it in numbers, your knowledge is of a meagre and unsatisfactory kind " = Lord Kelvin.

When I was young (I was young once! – for that matter nobody can be young twice) I used to think that all schools were littered with scales. The idea was probably inspired by the sight of children carrying geometry boxes. Schools were little kingdoms and all the teachers were rulers. Some of the rulers ruled with rulers – I mean, scales. Indeed, for a good measure, scales were used as punitive instruments. Scales and schools then have a measure of inseparability. If you have any doubt on this score, please watch the schools of fish. Let the scales, if any, fall from your eyes.

Little then did I realise that my future vocation would be that which is dominated by `scales'. Meteorology is precariously perched/balanced on scales.

In independent professions like the practice of law, one can move laterally all the time, fearing no lack of advancement. But in fields like that of Meteorology, a professional has to work within the frame-work of a large-scale organisation. The motivational force for satisfying the normal desire of an individual for advancement has then to be provided by the organisation. In a large-scale organisation, ordered scales (like that of pay) and rungs as in a ladder are a must for providing one of the motivational forces. Meteorology shares with other field sciences this characteristic naturalness of relation between its practice and scales.

Meteorology, as a science too is dominated by scales. The Sea mens' introduction to meteorology starts with primers in Beaufort's scale. The central core of Meteorology, the theme song, as it were, is `pressure'. Pressure is indeed used as a scaling device, in meteorological schemes only(?); x,y,p (p for pressure) co-ordinate system is an example. In fact, the positive relation between the horizontal convergence and upward vertical acceleration is shown in better relief, when the continuity equation is cast in x,y,p system.

$$\partial u/\partial x + \partial v/\partial y + \partial w/\partial p = 0$$

where $w = dp/dt$ and u, v are horizontal components of wind velocity and `p' is the pressure and `t' refers to time.

Pressure is not only a good scale, but a good scalar too; though in our unguarded moments, it would appear to be a vector in disguise; for pressure is well-known for its `avatars' as pressure force and pressure gradient force.

Two fundamental features that underscore the study of Meteorology are the two balances – that keep the scales even (1) The assumption of hydrostatic balance. Here the giant gravitational force at a point is neutralised by the vertical component of pressure-gradient force. (2) The assumption of geostrophic balance. Here the real pressure-gradient force is equalled and opposed by the not-so-real coriolis force.

If these balances were to be perfect and even, much weather that depends on acceleration of air flow would not occur. The weather, as we know, depends on the tipping of the scales of the pan – the balances. For instance, if vertical upward acceleration is to occur, the vertical component of pressure-gradient force must outweigh(!) the gravitational force. Weather and climate consist in these kinds of disequilibriums setting in and Nature valiantly struggling to restore the balance.

The point is that the end-result of a meteorological event is a consequence of several features – ranging over a vast spectrum of scales, (spacewise, temporal and energywise) – microminiscule to planetary – cascading one into another, some in co-operative mode, yet some others in cancelling kind (See Tables 1 and 2).

The schema in Meteorology call for the judicious use of terms in various equations selected for processing a particular phenomenon. This judicious use in turn calls for an appreciation of the scales involved – a scaling analysis – for the retention / rejection of the terms.

A wise man said that nothing in fact is too small to be ignored. He postulated that the flappings of butterflies in Beijing can churn a tornado in Texas. A beautiful imagery indeed! So very imaginative.

As in other fields of human endeavour, in Meteorology too, old concepts when they fail to account for new facts and findings have to be appropriately scaled off (scrapped off), just as scales have to be done with in boilers. The reach of the subject can then only be scaled up!.

TABLE 1 - Spatial and temporal scales

Phenomena	Horizontal scale	Life-time
Molecular diffusion	Fraction of a centimetre	Seconds
Turbulence	1-100 metres	Seconds to minutes
Sound waves	330 metres/sec	Seconds to minutes
Dust devil	Hundreds of metres	Seconds over a location
Small cumulus	Tens of kilometres	10-20 minutes
Thunderstorm	Tens of km to hundreds of kms	20-60 minutes
Cyclonic storm	Hundreds of km	4 – 5 days from genesis to decay
Monsoon	1200 kms latitudinally	3-4 months
	Vertical scale	
Boundary layer	1-2 km	
Thunder cells	upto 1-6 km	
Cyclonic storm	cyclonic circulation up to 9 km	

TABLE 2 – Approximate K.E. of the systems

Sub-system	Associated K.E.(ergs)
Tornado	$10^{19} - 10^{21}$
Small thunderstorm	$10^{20} - 10^{22}$
Large thunderstorm	$10^{21} - 10^{23}$
Hurricane	10^{25}
Extra-tropical cyclone	10^{26}
General circulation	10^{27}

Monsoons of 2000

(Based on real-time data)

S.K.SUBRAMANIAN

SOUTHWEST MONSOON

Onset :

The onset process of the southwest monsoon commenced on 15 May when it advanced into south Andaman Sea and adjoining southeast Bay. It further advanced into Comorin-Maldives area, Parts of Bay, parts of Northeast India on 29 MAY before advancing into Kerala.

It set in over Kerala on the normal date viz. 1 June. By 9 June it rapidly advanced over south peninsula, Maharashtra, Orissa, Northeastern States, West Bengal and Sikkim, some parts of MP, UP and HP under the influence of a low pressure area which formed over west central Bay of Bengal and later moved into Haryana and neighbourhood across Orissa, North MP and adjoining south UP during the period 4-9 June.

There was a lull in the progress of the monsoon during the period 10 – 22 June and 24 – 29 June. It covered the entire country on 2 July, 13 days earlier than the normal date (15 July).

Rainfall during southwest monsoon 2000 :

Seasonal rainfall was in excess in 5 meteorological subdivisions, normal in 23 and deficient in 7 sub-divisions. The sub-divisions, which recorded rainfall deficiency during southwest monsoon period, were Saurashtra & Kutch (-45%), West Madhya Pradesh (-37%), Andaman Nicobar Islands (-31%), Gujarat Region (-30%), East Rajasthan (-31%), East Madhya Pradesh (-29%), West Rajasthan (-21%).

Nineteen Met sub-divisions received excess /normal rainfall during all the 18 weeks of the monsoon season. They were Sub-Himalayan West Bengal, Bihar Plateau, Uttar Pradesh (3), Haryana, Punjab, Himachal Pradesh, Jammu & Kashmir, Maharashtra (4), Andhra Pradesh (3), and Karnataka (3). Andaman & Nicobar Islands and Saurashtra & Kutch received only deficient / scanty rainfall in 17 out of 18 weeks. In 12 – 14 weeks during the season, NMMT, Madhya Pradesh (east & west), Tamilnadu & Pondicherry and Lakshadweep received poor rainfall.

Month wise rainfall distribution in terms of number of met subdivisions receiving Excess, normal, deficient and scanty rainfall is given below.

	Excess	Normal	Deficient	Scanty
June	17	9	7	2
July	3	21	10	1
August	9	10	15	1
September	7	7	12	9
Season	5	23	7	0

Cyclonic disturbances :

No cyclones formed during southwest monsoon season. No monsoon depressions also formed during June and July 2000. Two monsoon depressions and 13 low-pressure areas affected the rainfall distribution during the season

First Monsoon depression of the season formed over west-central Bay off north Andhra coast on 23 August. It crossed North Andhra Coast near Kakinada on 23rd night. Moving in a west-northwesterly direction it weakened as a well-marked low-pressure area over Telangana on 24th.

One Land Depression formed over Gangetic West Bengal on 1st September. The system moved in a west-northwesterly direction and weakened as a low-pressure area over east Uttar Pradesh on 4th.

Off-shore trough persisted along different parts of the west coast on most of the days from 16th May to 4th September except for the periods 8-10 June, 16-25 June, 16 July–7 August and 23 – 30 August.

Withdrawal of southwest monsoon :

Southwest monsoon withdrew from West Rajasthan and some parts of Kutch on 13th September (Normal date 15 September), from Madhya Pradesh by 4th October (almost normal), from Northeastern States and Orissa by 13th October (delay of 3-5 days), from Maharashtra by 23rd October (delay of 20 days). It withdrew from the entire country by 25th October (delay of 10 days).

NORTHEAST MONSOON 2000

Advance :

Northeast Monsoon set in over Tamilnadu, Pondicherry, Kerala and adjoining areas on 2 November, with a delay of 12 days (Normal date being 20 October).

Cyclonic disturbances :

Two Cyclones (both in October), Two Very Severe Cyclones (one each towards the end of November and December) and a low-pressure area around 21 November controlled the rainfall activity during this season.

The first cyclone (15-18 October) formed over East Central Bay. Initially it moved northwest, then towards southwest and finally in a northwesterly / westerly direction. The system weakened over west Central Bay off Andhra coast without making a landfall. Movement of this system was very sluggish.

The second cyclone (26-28 October) formed over east Central Bay. It moved northwest and then north to make a landfall east of Sagar Islands.

The very Severe Cyclone (26-29 November) formed as a depression over East Central Bay. It crossed Tamilnadu coast close to Cuddalore on 29 evening. The system moved westwards, weakened and finally emerged into the Arabian Sea as a low pressure.

The very Severe Cyclone (25-28 December) formed over southwest Bay. It had multiple landfalls, one close to Trincomalee in Srilanka and the other near Tuticorin during early hours of 28th.

The low-pressure area that formed close to Tamilnadu coast around 21 November helped to revive the rainfall activity over Tamilnadu after a prolonged dry spell.

Rainfall activity during northeast monsoon :

There were three significant rain spells during this season. (19-24 November, 30 November – 1 December, 27-29 December).

Seasonal Rainfall during northeast monsoon over different met subdivisions in the south peninsula is as shown below :

Coastal Andhra Pradesh	-57%
Rayalaseema	-9%
Tamilnadu & Pondicherry	-28%
South Interior Karnataka	12%
Coastal Karnataka	-27%
Kerala	-27%
Lakshadweep	-37%

District-wise Rainfall distribution in terms of number of districts which received excess, normal, deficient, and scanty rainfall is indicated below :

	Excess	Normal	Deficient	Scanty	Total
Tamilnadu & Pondicherry	1	9	17	3	30
Kerala	1	4	9	0	14
Coastal AP	0	0	6	3	9
Rayalaseema	1	2	1	0	4
Coastal Karnataka	0	0	3	0	3
South Interior Karnataka	6	7	1	0	14

Withdrawal :

Northwest Monsoon withdrew from the country on 6 January 2001.

'Meteorology' helps 'Mathematics'

A.S.PONNUSWAMY

It is well known that sometimes chance meetings of great minds produce great events and stunning results. This is so especially in fields of literature and science .

Students of Meteorology know how tall a figure Dr.Gilbert T.Walker, FRS, Director General of Observatories was in the field of Meteorology. Similarly the whole scientific community knows and cannot avoid knowing how tall a mathematician Srinivasa Ramanujan is, especially in the field of absract algebra; but most of us may not know it was Dr.Walker who was instrumental in the "making of Ramanujan", from a Clerk in Madras Port Trust to an international celebrity who puzzles mathematicians world over.

*Quoted below is an account of Dr.Walker, the good samaritan's help to Ramanujan.

"Dr.Gilbert T.Walker, F.R.S., Director General of Observatories, Simla visited University of Madras in February 1913 and Sir Francis Spring, the then Chairman, Madras Port Trust, drew his attention to Ramanujan's notebooks. Dr.Walker, a good mathematician and a Senior Wrangler, was a former Fellow of Trinity College, Cambridge, as well as a lecturer, and he immediately recognised the intrinisic quality of Ramanujan's work. He wrote to Mr.Francis Dewsbury, the Registrar of Madras University, commending the work of Ramanujan to be comparable in originality with that of a Mathematics Fellow in a Cambridge College, though lacking in the precision and completeness necessary for establishing the universal validity of the results. He wrote that it was perfectly clear to him

that the university would be justified in enabling S.Ramanujan for a few years at least to spend the whole of his time on mathematics without any anxiety as to his livelihood. **

He also wanted the University to correspond with Mr.Hardy, Fellow of Trinity College, Cambridge, since Ramanujan was already in correspondence with Hardy, assuring Mr.Hardy of the University's interests in Ramanujan. The recommendation of Dr.Walker was accepted by the Board of Studies of the University of Madras, and Ramanujan was granted a special research scholarship of Rs.75/- per month for two years with the express consent of the Governor of Madras and the condition that Ramanujan should submit quarterly reports on his work. The Madras Port Trust granted Ramanujan two years leave (on loss of pay) to enable him to accept this scholarship from May 1913, as the first research scholar of the University of Madras. Thus began his research career as a professional mathematician".

Let us, meteorologists, feel proud about this on the occasion of our celebrating 125 years of IMD's service to the nation.

** underlined words – by the author of this article

* An extract from the recently published book "Srinivasa Ramanujan – a mathematical genius" – by K.Srinivasa Rao [East West Books (P) Ltd., Chennai –1998 – Reprint 2000].

Meghadhootham (Message through cloud) - Study by a meteorologist

P.V.SANKARAN and **B.AMUDHA**

While meteorologists look up to the cloud for precipitation which solves all our water problems the Sanskrit poet Kalidas uses the cloud to send a message by a Yaksha (a semi-divine person) to his wife who lives far away from him. The Yaksha is sentenced by his Master to one year's exile to the hills of

Rama giri (near the source of the river Narmada and north of Nagpur, Maharashtra) leaving his wife at Alaka the abode of the Yaksha. The separation from his wife was unbearable for him and he sent through the cloud a message conveying his anxiety for reunion.

An attempt has been made in this article to analyze one of the best lyrical poems the world has ever seen from the angle of a meteorological observer. The panoramic beauty of nature as illustrated by the poet is slightly overlooked and the cloud (one of the meteorological elements) is given importance. A study has been made in this article regarding application of meteorological science as far as the cloud element is concerned. Perhaps the most beautiful description of monsoon clouds appears in this Sanskrit classic, describing the arrival of the monsoon over Ujjain (in Madhya Pradesh) on the 1st day of Asadha (15th June). This is a surprisingly accurate estimate of the date on which monsoon rains arrive over this part of India.

South West Monsoon being active in Central India during 2nd week of June, it is seen that the poet has a clear knowledge of the onset of SW monsoon in that region and knows that winds will be favourable for the movement of the cloud (the messenger) from Ramagiri to Alaka, near Mt.Kailash in Tibet. The poem begins in the seasonal month of Asadha representing SW monsoon, when the presence of rain-bearing clouds is much seen in the sky brought about by SW-ly wind. This it seems has been observed by the poet as a study of the wind flow and the movement of the cloud from Rama giri to Alaka.

Cloud's movement is from Ramagiri to the Himalayas- towards NE of Kashmir and western region of Tibet. Cloud passes through Ujjain in a westerly course. The long journey of the cloud suggests that it must be a cloud system associated with a large scale circulation.

The meteorological cycle of formation of aerosols, evaporation of water, formation of clouds and rain drops, precipitation etc. are well taken care of as the poet directs the cloud to replenish its moisture content and thereby regain its strength as it precipitates enroute by passing over various rivers like Narmada, Vethravati, Nirvindhya, Sipra(near Ujjain), Gambira, Charmanwati by absorbing moisture while travelling over land, forest, and mountains to the delight of birds/animals/human beings. It is also indicated that the rivers also await the arrival of rain bearing clouds as the rivers can recharge their water content which had been depleted due to summer heat.

The poet also says that the cloud belongs to the well-known race of clouds called Pushkaravartaka, (which assumes forms at will) a high category of cloud which indicates the Cumulonimbus cloud. Formation of cloud and the associated precipitation is the end product of any weather system. All living organisms on the earth look up to the sky for a rain bearing cloud and chances of a shower. Water is a necessity for sustenance of life of all human beings.

Mother Earth springs out in all her greenish splendour as soon as the rain falls on her and percolates down. Understanding its importance, the dynamics of cloud is studied under Cloud Physics. The composition of the cloud stated by the poet, is water vapour, smog, fire sparks etc. which tally with the scientific composition as is being dealt with now.

That being the case, the poet Kalidas, views the cloud in a different angle which is a sole right of a poet and uses the cloud as a messenger to send greetings to his wife from whom he was separated. To put it in modern parlance, the cloud does the job of a courier service.

On the first day of Asadha, the Yaksha sees a cloud struck to the peak of a mountain beautiful like an elephant giving side blows to his sportive buttings. As the cloud sits pretty on the peak of the mountain, the Yaksha tells the cloud to be his messenger to his wife in the city of Alaka. In the description of the cloud, the poet says that the cloud consists of smoke, luminary (electrically charged particles), ice particles, water and air (all inanimate things). To this cloud, the message is conveyed by the Yaksha. The poet compromises by saying that the love-striken are by nature ignorant to distinguish between animate and inanimate things.

There is a mention about the cloud assuming forms at will which indicates change of shape. There is a mention about the cloud being seen by wives of businessmen with an eager look as they are comforted with the thought that their husbands will return to their homes due to the onset of rainy season. The Yaksha tells the cloud to slowly proceed towards his wife's place with gentle breeze prodding the cloud on and on, seeing so many lovely sites in its route.

The rumbling noise(thunder) of the cloud which makes the earth bloom by the precipitation, is heard by the swans (migratory birds) and they start their journey giving company to the cloud upto Kailash. The cloud embraces the mountain Rama giri and when precipitation falls, it looks like the hot surface of the mountain shedding tears of joy at the union of friends.

Farmer-women seeing the movement of the dark cloud get the feeling of the wind throwing down mountain peaks. A rainbow that arises from the top of the hill will make the blue body of the cloud attain excellent splendour. The dependance of agriculture on rains is understood well from the warm welcome accorded by the farmers to the cloud. After taking rest on the mountain Amrakuda (source of river Narmada – eastern side of Vindhya range) where it extinguishes forest fire by its sharp showers, the cloud sheds its weight through discharge of water and moves towards the slopes of Vindhya and sees the river Narmada over that place. The cloud is being asked to recoup its moisture content by coming into contact with Narmada river.

The poet describes the cloud being accompanied on the ground with jumping deers and dancing peacocks. The poet advises the cloud to recharge itself with moisture by the rippling waters of the river Vethravati. The cloud is being advised to take rest on the hill named Nichaih. Having rested the cloud is advised to proceed sprinkling rain drops on the buds of jasmine flowers growing on the banks of forest rivers.

The cloud will give shade and thus do service to the women gathering flowers there who appreciate the presence of the cloud. The poet indicates that the cloud proceeds northwards even though the route is circuituous. The poet asks the cloud to go to Ujjain to have a look of the beautiful palaces and the damsels of the city.

The cloud is being asked to have contact with the river Nirvindhya enroute. From Ujjain the cloud moves to Avanthi. In Ujjain the cloud can drink water from the river Sipra, waters of which is sweet and fragrant through contact with the smell of blown lotuses.

The poet asked the cloud then to proceed to the abode of Chandeeswarar who will look up to the cloud as it is the throat of Lord Shiva because of its dark blue complexion. Having witnessed the evening pooja at Mahakaleshwar temple, the cloud is asked to move on showing path to the night travellers by its streak of lightning.

Having rested on housetops, the cloud may traverse the remaining path as men having undertaken errands of friends do not indeed tarry. The poet then asks the cloud to come in contact with the clear water of the river Gambira to charge itself with moisture. Then the cloud is asked to proceed to Devagiri (Daulatabad) along the wind direction.

At Devagiri, the cloud is asked to shower Skanda – the presiding deity - by pouring flowerlike water droplets. The cloud naturally will delight the peacock, the vehicleof Karthikeya which dances on sighting the cloud by spreading its plumes. Having worshipped Karthikeya the cloud is asked to proceed towards the direction of Charmanwati river. The dark-blue coloured cloud descending on the river will look like a pearl necklace of mother Earth set with a blue saffire. Having crossed the river Charmanwati the cloud moves through Dasapura. Then the cloud is asked to land in Kurukshetra where the glorius Mahabaratha war took place. The cloud is asked to purify itself by drinking the waters of Saraswathi. From there it is asked to proceed to Kanakhal (near Haridwar).

The cloud reaches Himalayas, the source of Gangotri where it can take rest, enjoying the mountain stone perfumed with musk deer. The cloud is asked to extinguish the forest fire of the Himalayas. The moral implied is that the wealth of the good must be sent to reduce the pain of the distressed. The cloud is asked to attack a herd of deers with a heavy shower of hail stones. For, in the cold region of the Himalayas, cloud's water particles will condense into hailstones. The shower of hailstones is sure to scatter away the herd of deers.

The cloud is asked to circum-ambulate the footmark of Lord Shiva found in the rocks there. Having crossed the objects worth-seeing viewed in an obliquely long posture the cloud proceeds northwards towards Krauncha Hill which is used by swans (migratory birds) as doorway to their migration to and fro from Manasa lake. Going upwards, the cloud becomes the guest of Mt.Kailash, the mount with its high lily-white peaks pervading the sky. The cloud with the colour of powdered collyrium (Kajal) having reached the slope of Mt.Kailash is worth watching for its natural looks.

The poet gives clear instructions to the cloud as to the location of the house of the Yaksha's beloved at the city of Alaka on Kailash (near Manasarovar). The poet tells the cloud to use lightning as its eye and locate the presence of the lady of the house. The poet directs the cloud not to thunder when the lady is asleep. Taking care that all the instructions are followed, the cloud is asked to convey the message to the Yaksha's beloved wife. After the successful completion of the job assigned to it, the poet tells the cloud to wander freely together with its spouse lightning in that region getting ready to bring forth a fresh spell of rains and happiness thereafter.

An appeal

Members of IMS Chennai chapter are requested to contribute generously towards the Gujarat earth quake relief fund. Donation by cash may kindly be given / sent to Shri E.R.Sukumar, Treasurer of our chapter. Payment by Money order may be addressed to Shri E.R.Sukumar, Treasurer. Payment by cheque or DD may kindly be drawn in favour of

"Indian Meteorological Society, Chennai chapter"

and sent to

Dr R.Suresh, Secretary or Shri E.R.Sukumar, Treasurer,
C/o Regional Meteorological Centre,
50 College Road,
Chennai 600 006.

It is requested that the donation may kindly be sent as expeditiously as possible so as to reach the Treasurer by 15.2.2001. The chapter will arrange to send the doanted money to the Prime Minister's relief fund.

CHAPTER NEWS

Scientific lectures :

(1) "Five decades of striving for excellence" by Dr T.K. Ray, Deputy Director General of Meteorology (Telecom), Indian Meteoroloical Department, New Delhi 110 003 on 31.8.2000.
(2) "Lasers in meteorology" by Dr K. Subramanian, Member Secretary, Tamilnadu State Council for Science and Technology, Chennai on 13.11.2000.
(3) "Radar rainfall measurements- ways to develop algorithms for the Indian sub-continent" by Prof V. Chandrasekar, Colorado State University, Colorado on 21.11.2000.
(4) "The IPCC findings on climate change" by Dr N. Sundararaman, Secreatry, IPCC, Geneva on 2.1.2001.

Seminar on "Monsoons of 2000" :

A half day seminar on "**Monsoons of 2000**" was conducted in collaboration with Regional Meteorological Centre, Chennai on 22.1.2001 at the Conference Hall of Regional Meteorological Centre, Chennai. The following lectures were presented.

(i) "Review of Monsoons 2000" by Shri S.K.Subramanian, Director, Area Cyclone Warning Centre, Regional Meteorological Centre, Chennai 6.
(ii) "Impact of monsoons 2000" by Dr Chhattra Sal Singh, IAS, Principal Commissioner, Commissioner of Revenue Administration and State Relief Commissioner, Govt. of Tamilnadu, Chennai.

The seminar was well attended by Scientists from various scientific institutions / R & D establishments besides IMS members. Press and television media gave wide publicity and fully covered the seminar.

Future event :

A seminar on "**Public weather services and disaster management**" has been planned in collaboration with Regional Meteorological Centre, Chennai and Centre for Disaster Mitigation and Management, Anna University, Chennai. The seminar will be conducted during April 2001. Active participation by the user agencies of meteorological information and services is contemplated.
