

**First Global Forum on Heat and
Health**

Hong Kong

17-20 December, 2018



**Panel Discussion on
Regional Heat issues**

South Asia Heat Trends and the State of Science in Forecasting/Applications

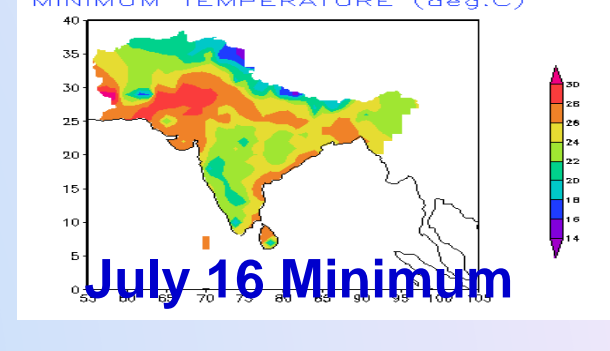
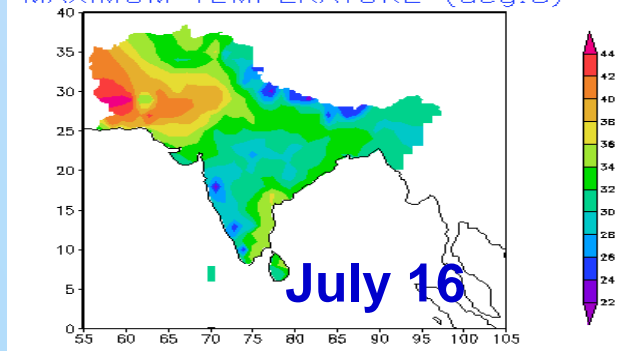
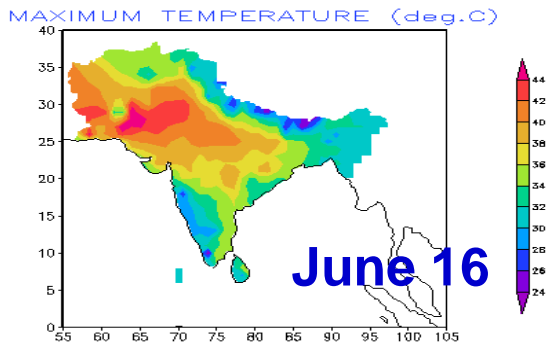
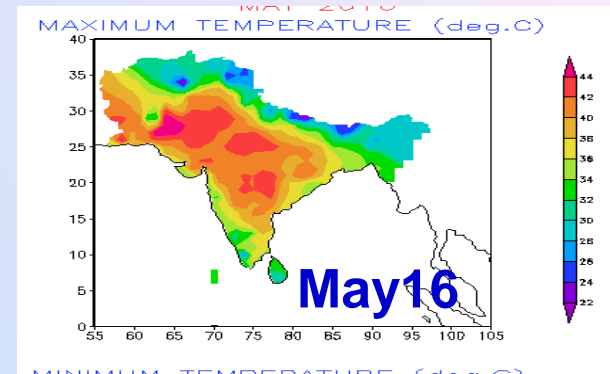
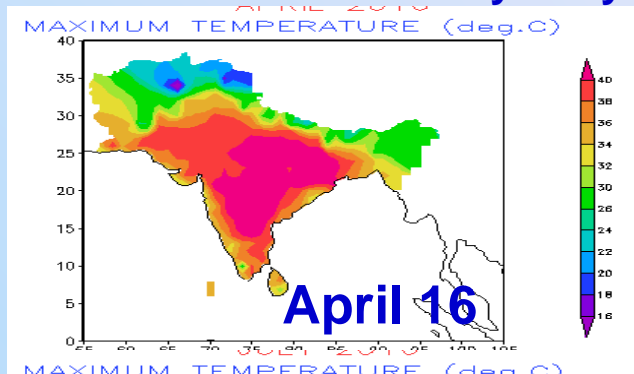
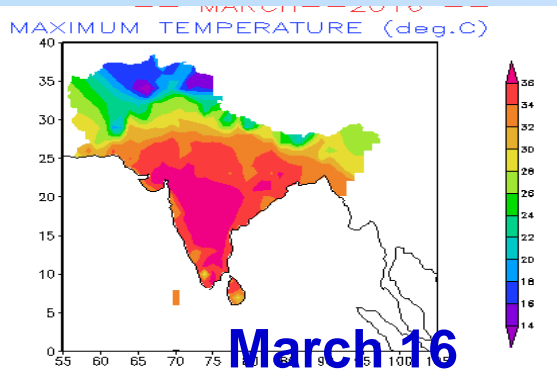
**SC Bhan, Naresh Kumar, Anup Kumar Srivastava and Dilip
Mavalankar**

scbhan@yahoo.com, sc.bhan@imd.gov.in

**भारत मौसम विज्ञान विभाग
INDIA METEOROLOGICAL DEPARTMENT**

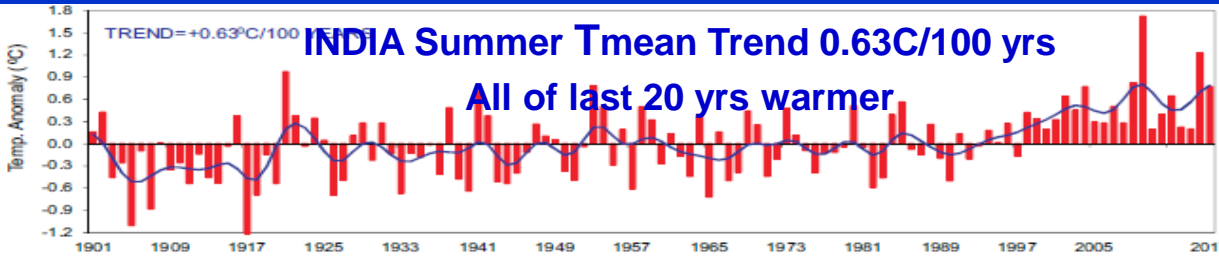
Summer Temperatures in the Region

Starts building up from Sri Lanka and the south & central parts of India in March AND Peaks towards end of May/early June

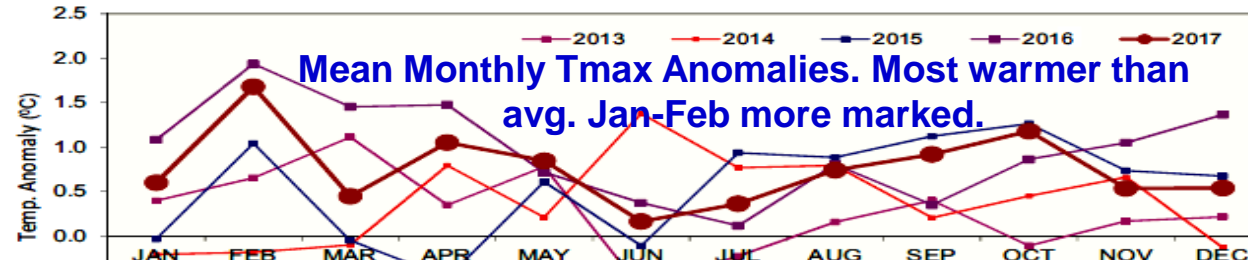
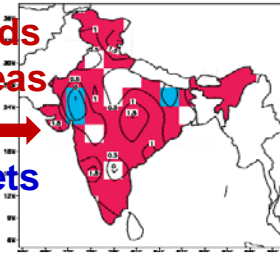


- Some parts, particularly northwest India and south Pakistan, could remain quite warm into entire June/ early July in case of late onset OR weak monsoon
- Warm Nights and High Humidity are added issue in July in NWI & S Pak

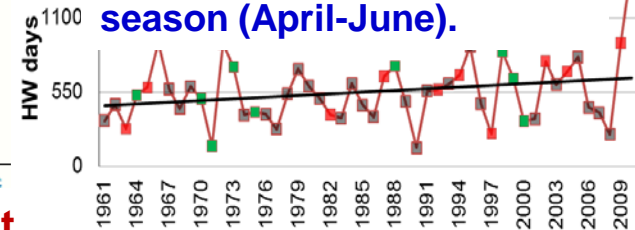
Observed Trends



- Annual Tmean Trends (C/100 yrs) Most Areas Warming
- A few cooling pockets For how long ?

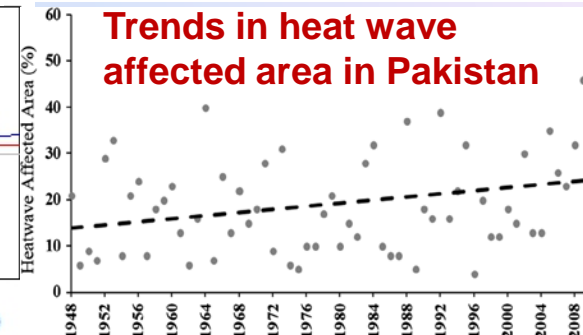
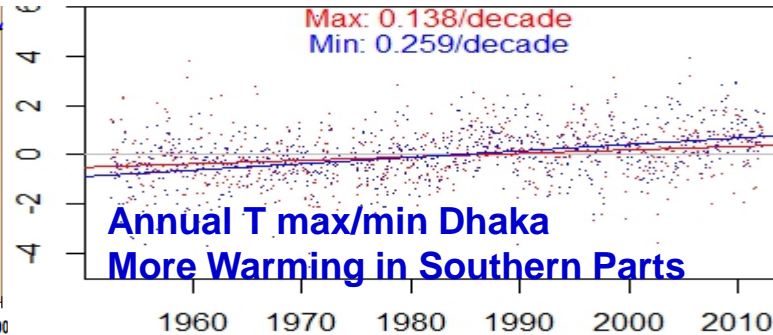
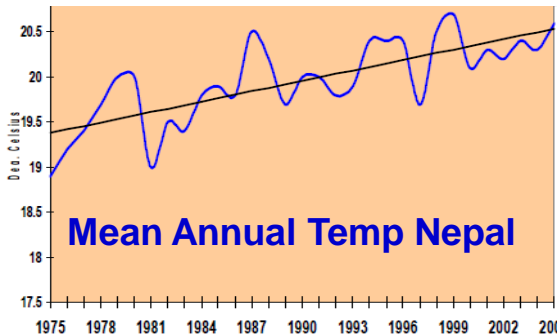


HW days India hot weather season (April-June).



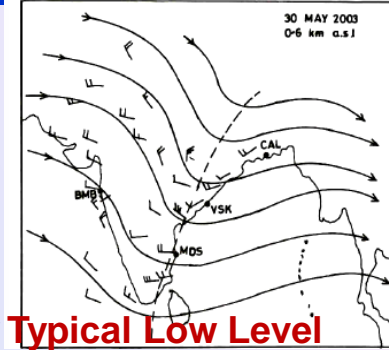
Warmer Post Monsoon & Winters = Prolonged & Early Heat Load AND Stress on Agriculture and on Water resources which have implications for Heat Management issues

**14 El Nino- 9 warmer
 12 La Nina- 3 warmer**

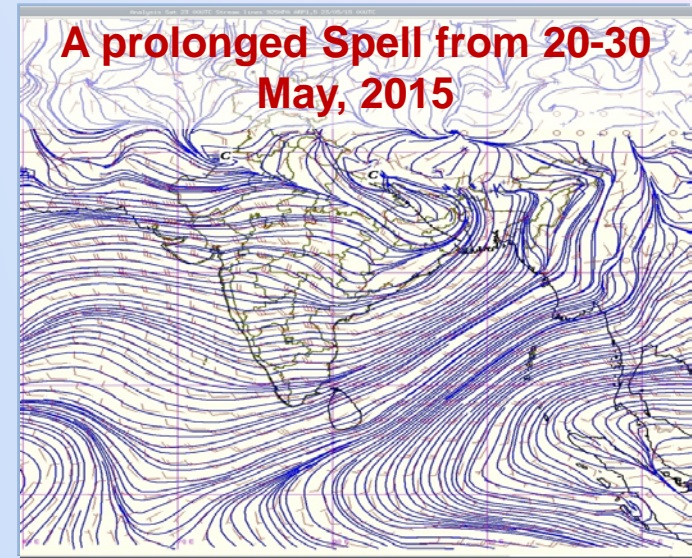
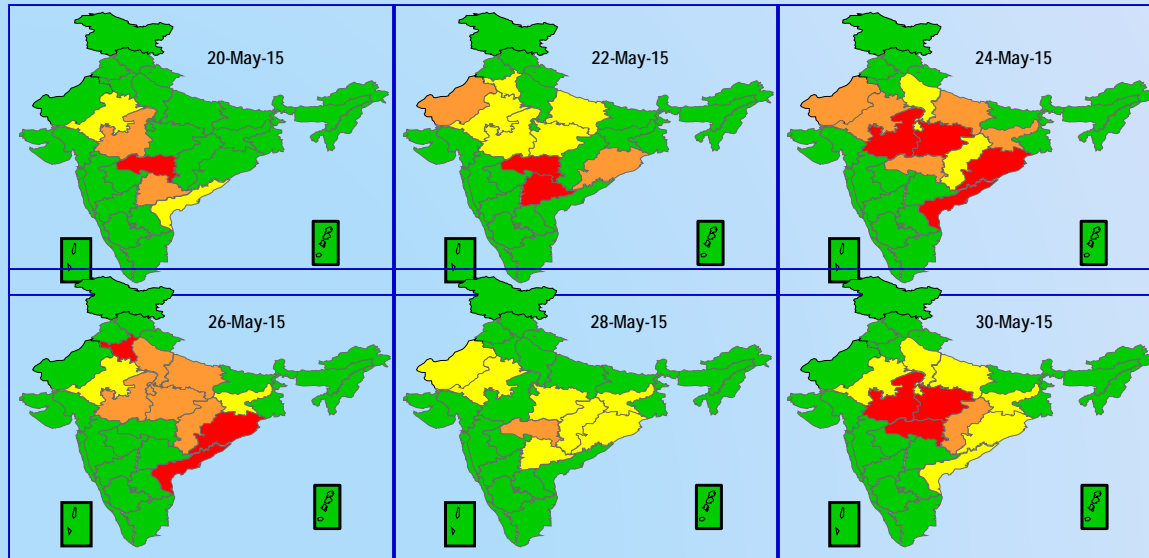


HEAT WAVE OVER INDIA

- In spells of 5 to 6 days (**recorded up to 15 days in some cases**). Severe HW 2-3 days (**upto 7 days**).
- Originate in April over Central India due to high insolation and stable atmosphere in absence of thunderstorm activity.
- Maximum frequency in May. HWs developing over NW India/Pak and are advected east & south by prevailing NW'y winds. Sustained N'wlies result in HW upto Bangladesh.

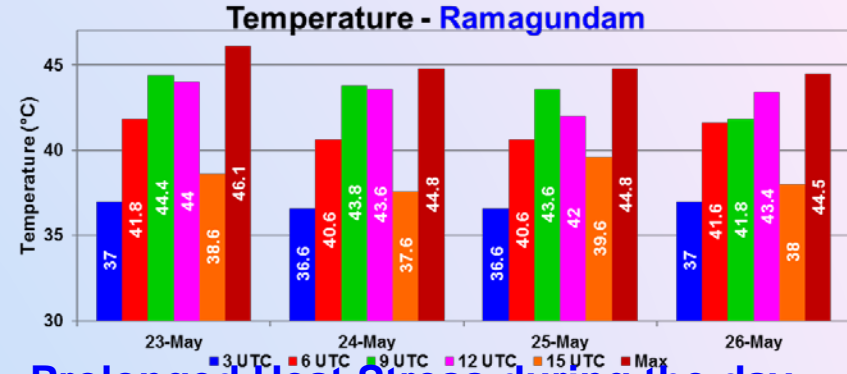


**Typical Low Level
flow Associated with
HW up to east coast**

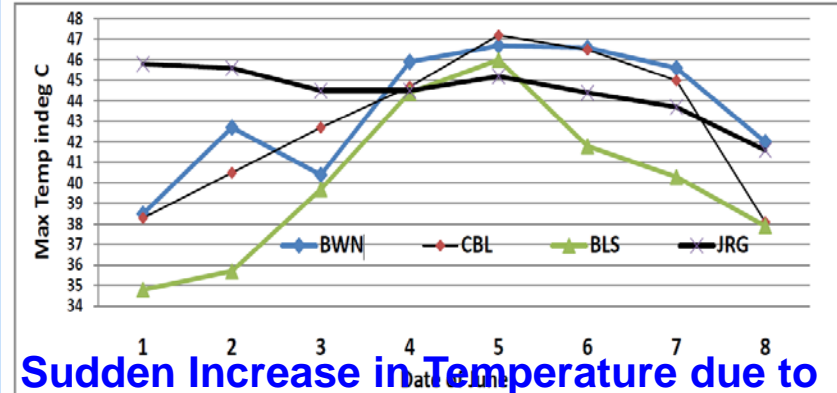


Sub-Div	44° C & above		46 ° C & above	
	Days	Period	Days	Period
HRY	9	21-29	2	23,25
W UP	9	21-29	2	25-26
E UP	9	21-29	8	21-27 & 29
W. Raj	8	21-27 & 30	4	23-25 & 27
E. Raj	11	20-30	4	22, 25-27
West MP	11	20-30	2	20 & 29
East MP	10	21-30	1	29
Odish	10	20-29	5	22-27
Jhkd	9	21-29	6	22-27
Chht	11	20-30	5	25-29
Tel	11	20-30	11	20-30
C AP	9	20-27 & 30	7	21-27

Heat Wave 2015



Prolonged Heat Stress during the day



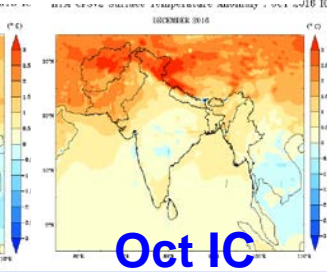
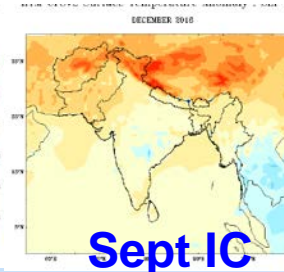
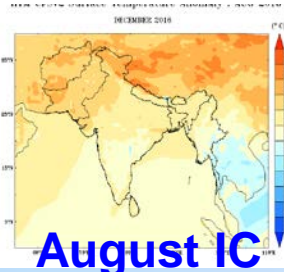
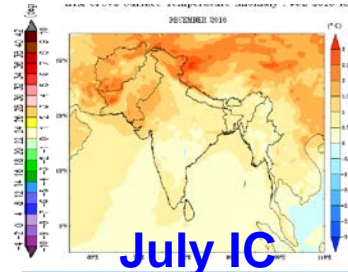
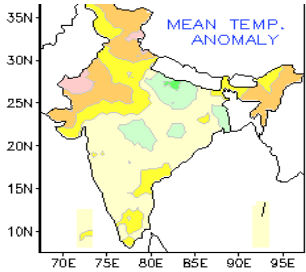
Sudden Increase in Temperature due to onset of w'lies over east coast

Coincidences with droughts are conflicting

Seasonal Outlooks & Forecast Skills

RCC, Pune: Seasonal Climate Outlook for South Asia every month for next 4 months (Current and FC ENSO, precipitation & temp anomalies FC Afg, B. Desh, Bhutan, India, Myn, Nepal, Pak & S. Lanka. The spatial pattern of Anomalies are reasonably well captured.

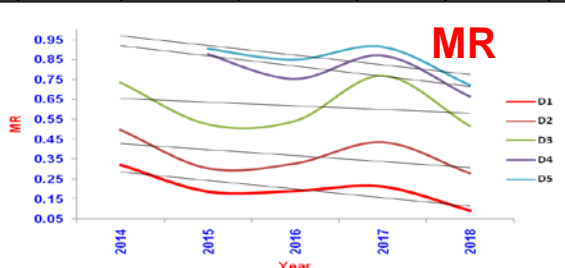
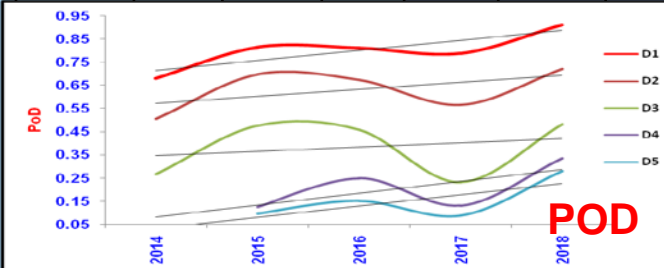
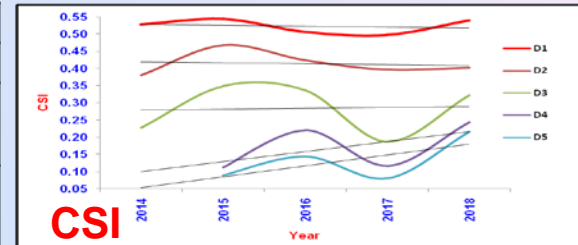
Mean Temp Anomaly Observations



and FC for December, 2016

The outlooks in India are found to be useful in Heat Wave Mgt. India

	FAR			MR			CSI			POD		
	D1	D2	D3	D1	D2	D3	D1	D2	D3	D1	D2	D3
2017	.07	.06	.02	.33	.51	.77	.40	.32	.19	.67	.49	.23
2018	.03	.04	.02	.09	.28	.52	.54	.40	.32	.91	.72	.48



D-5 warning accuracy in 2018 is higher than D-3 accuracy of 2017. The improvement in D-3 of 2018 warning is more than 100% compare to D-3 of 2017.

THANKS

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