

Impact of future air quality on public health and Indian Summer Monsoon rainfall



Sreyashi Debnath^{*1,2}, Sachin D. Ghude¹, Rajesh Kumar³, Chinmay Jena¹ and Himadri Saini⁴

¹Indian Institute of Tropical Meteorology (IITM), Pune, India.

²Dept of Atmospheric and Space Sciences, Savitribai Phule Pune University, Pune, India

³National Center for Atmospheric Research (NCAR), Boulder, USA

⁴University of New South Wales (UNSW), Sydney, Australia

Email: sreyashi.jrf@tropmet.res.in



1. INTRODUCTION

The Union Environmental Ministry of Government of India launched a new National Clean Air Program as an aggressive initiative for improving air quality in urban areas for reducing the public health risk thereby taking many strategic initiatives under the sustainable development goals (SDGs). With the recent policy interventions, emissions have shown to be improved in 2030, particularly PM_{2.5} concentration, compared to no policy baseline interventions. In this study, we have tried to assess the implications of emission reductions in 2030 using WRF-Chem model under different emission scenarios as per the aggressive policies implemented by the government and explore the consistency of these reductions with the objective of reducing the public health risk due to PM_{2.5} pollution. Also, from the model analysis of state-of-the-science Nested Regional Climate model with Chemistry (NRCM-Chem) based on version 3.6.1 of the Weather Research and Forecasting (WRF) model coupled with chemistry, we have tried to examine how the future chemistry is going to impact the Indian summer monsoon rainfall. Analysis shows some changes in the future summer monsoon rainfall pattern under both RCP 6.0 and RCP 8.5 scenarios.

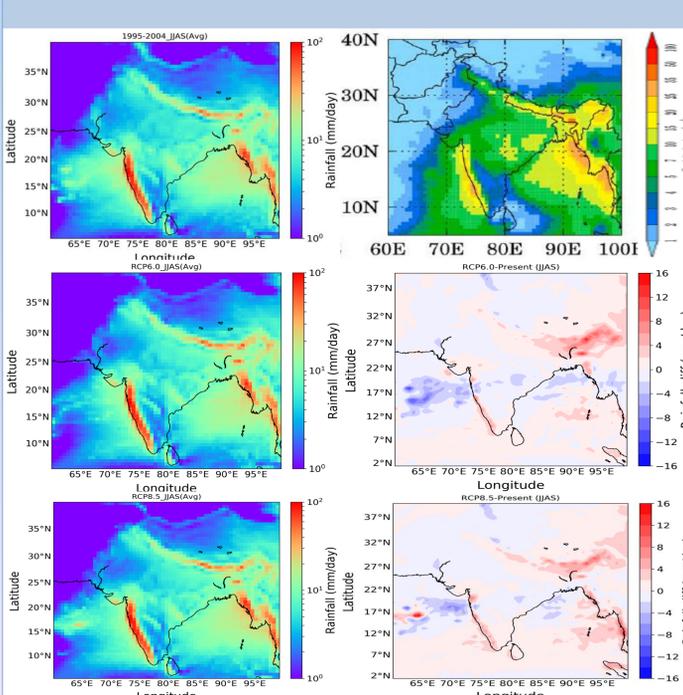
2. INCREMENT FACTORS

	BAU	S2	S3
BC	1.34715	0.92616	0.42098
NO _x	2.54518	1.91587	1.20266
OC	0.82279	0.69621	0.31645
CO	0.913003	1.59835	1.14977
NMVOC	0.72899	0.61570	0.28568
PM _{2.5}	1.66879	1.32113	0.52845
SO ₂	1.63604	1.16729	0.55147
NH ₃	1.28595	1.23604	1.14455

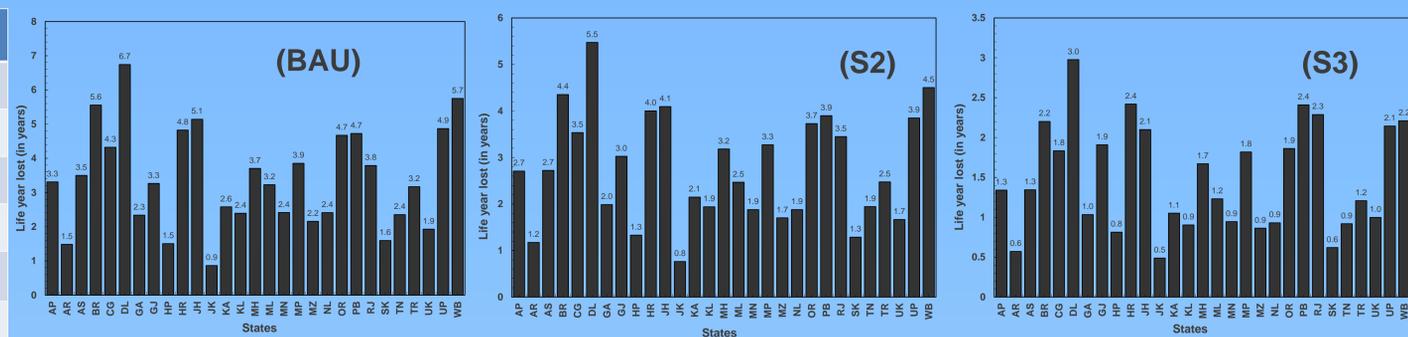
3. MEAN

30_80	BAU_2030_Pop.	S2_2030_Pop.	S3_2030_Pop.	BAU - S2	BAU - S3
COPD	187186	168093	116658	19093	70528
ALRI	11621	10316	6357	1305	5264
STROKE	305844	292271	223400	13573	82444
LC	4302	3858	2655	444	1647
IHD	393382	380678	334170	12704	59212
Total	902336	855216	683241	47120	219095
LE_mean	3.502	2.924	1.612	0.578	1.89

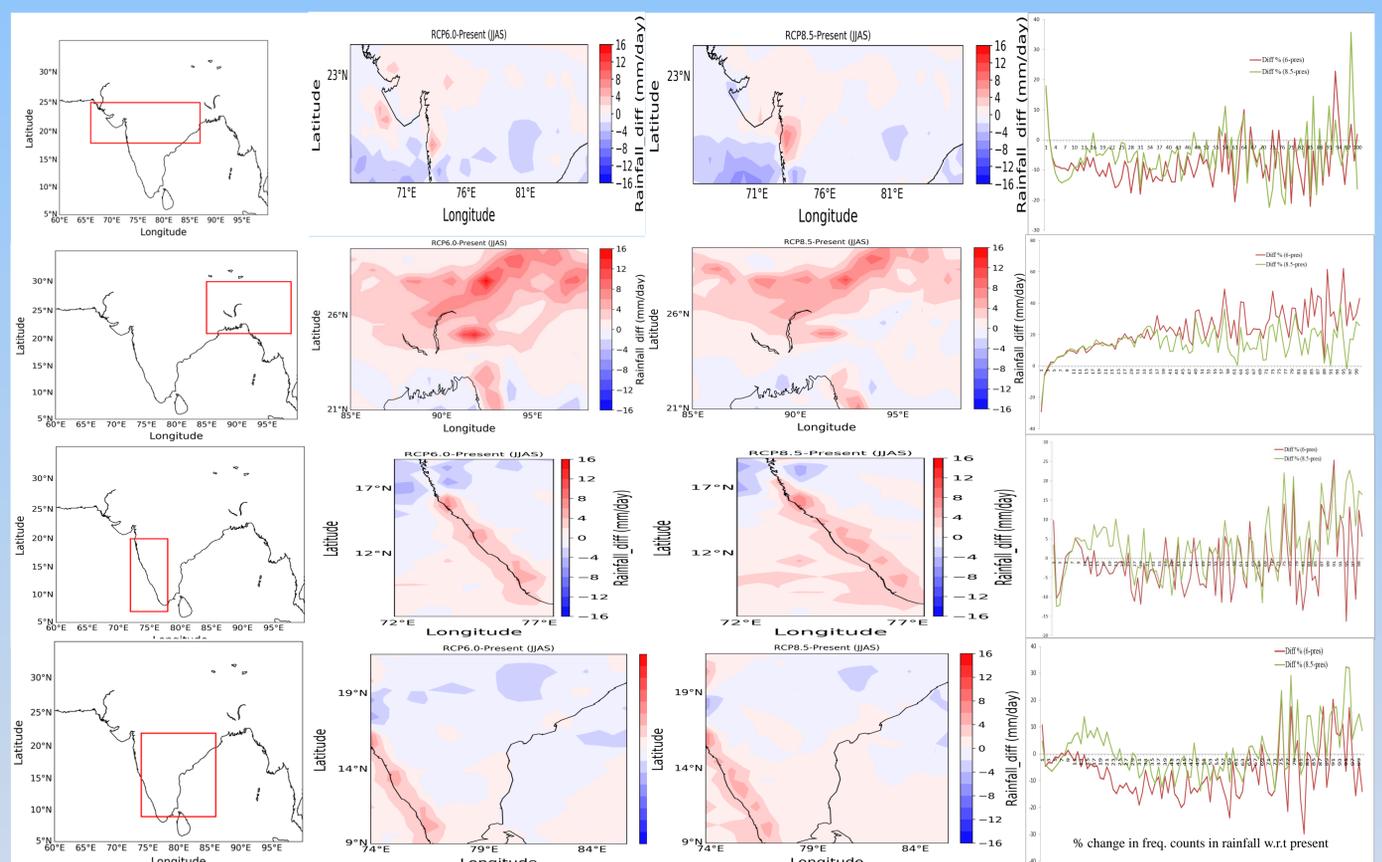
5. MEAN RAINFALL PATTERN DURING JJAS



4. MORTALITY_2030



6. REGION WISE MEAN RAINFALL PATTERN DURING JJAS



7. KEY POINTS

- The scenarios: BAU, S2 and S3 have been referred to as reference, aspirational and ambitious scenarios respectively.
- Decrease in mortality is achievable by mitigating emissions as per the S2 and S3 scenarios.
- Under projected scenarios of Representative Concentration Pathways : RCP8.5 and RCP6.0, during the wet season, NRCM-Chem predicts increase in precipitation over the IGP, northeastern India and a decrease over western and central India.
- It has been found that there is a change in the pattern of rainfall over different parts of India with a general decrease in moderate rainfall and increase in heavy rainfall with an exception over the north eastern part of India where there is an overall increase of rainfall under both the scenarios.

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9. REFERENCES:

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