Growth in mid-monsoon dry phases over Indian region: Prevailing influence of anthropogenic aerosols

Rohit Chakraborty[1], Bijay Kumar Guha[2], Shamitaksha Talukdar[*1], Madineni Venkat Ratnam[1], Animesh Maitra[3]

[1]National Atmospheric Research Laboratory, Gadanki, India,

[2]National Institute of Technology, Rourkela, India

[3]Institute of Radiophysics and Electronics, Kolkata, India

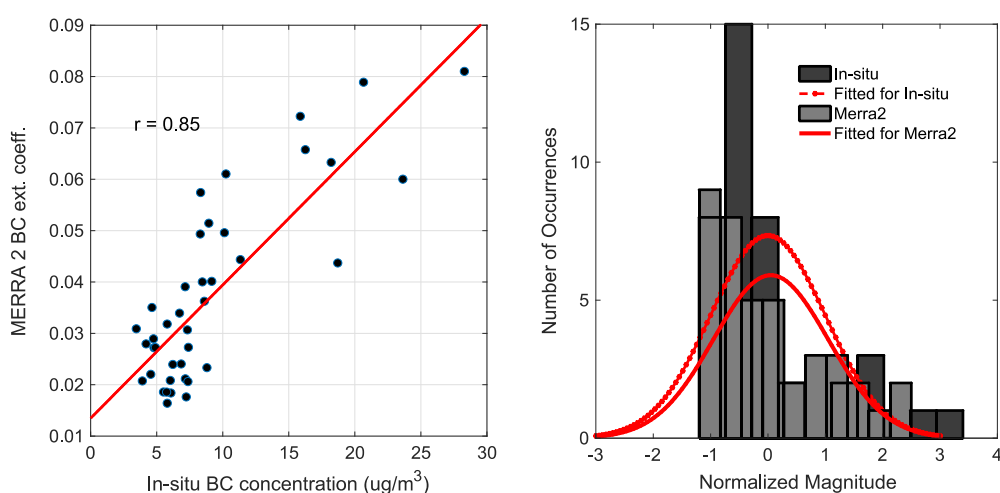rohitc744@gmail.com, bijayguha74@gmail.com, shamit@narl.gov.in[*]

Supplementary Figures

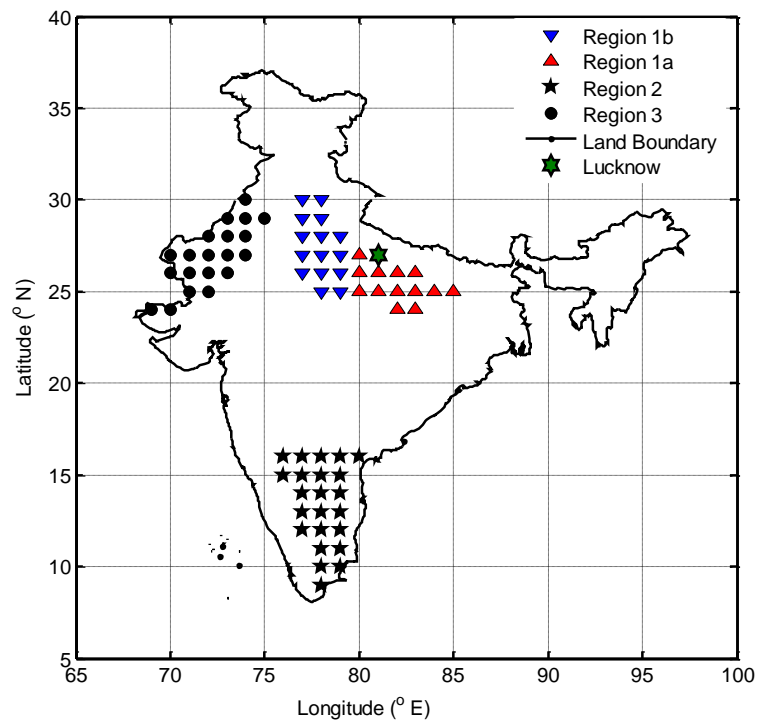**Figure S1.** Validation of MERRA 2 BC AOT.

Figure S2. Division of the study area into 3 broad regions.
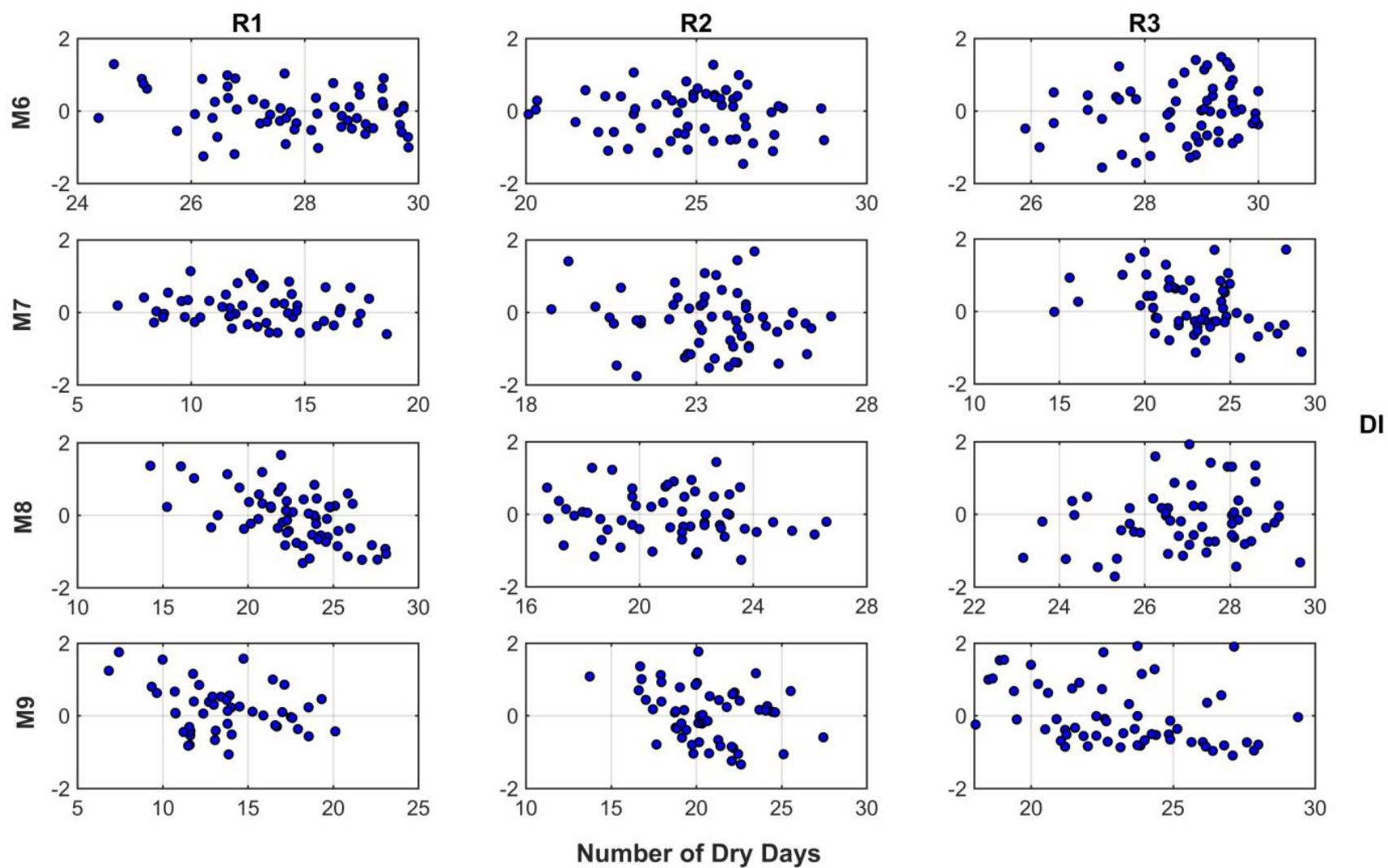
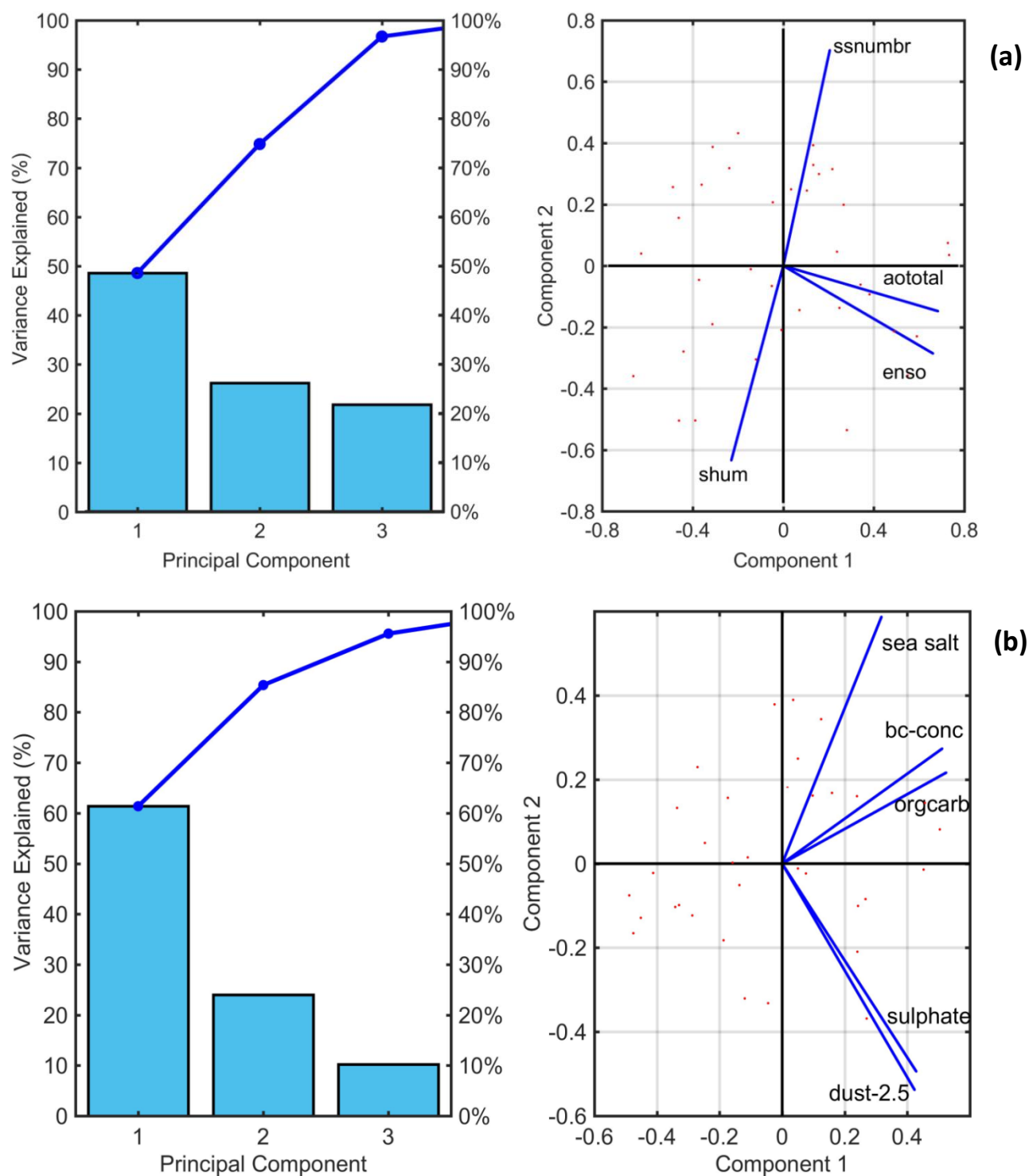**Figure S3.** Relationship between DDF and DI for different months across three broad regions.

Figure S4. Principle Component Analysis results for various controlling factors on DDF for region 1a, (a) using general parameters like total aerosols, SSN, ENSO and humidity (b) Variation of DDF corresponding to 5 aerosol components such as BC, Dust PM 2.5, OC, Sea Salt and Sulphates.
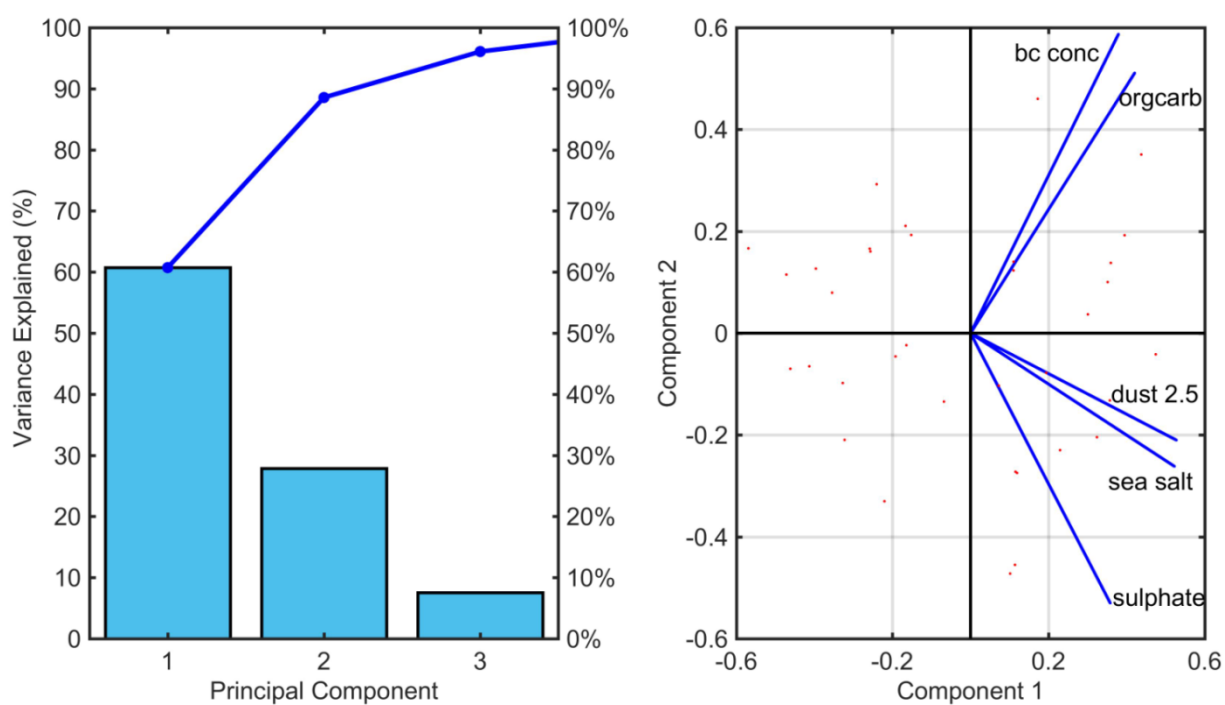
Figure S5. Principle Component Analysis results for various controlling factors on DDF for Lucknow corresponding to 5 aerosol components such as BC, Dust PM 2.5, OC, Sea Salt and Sulphates.
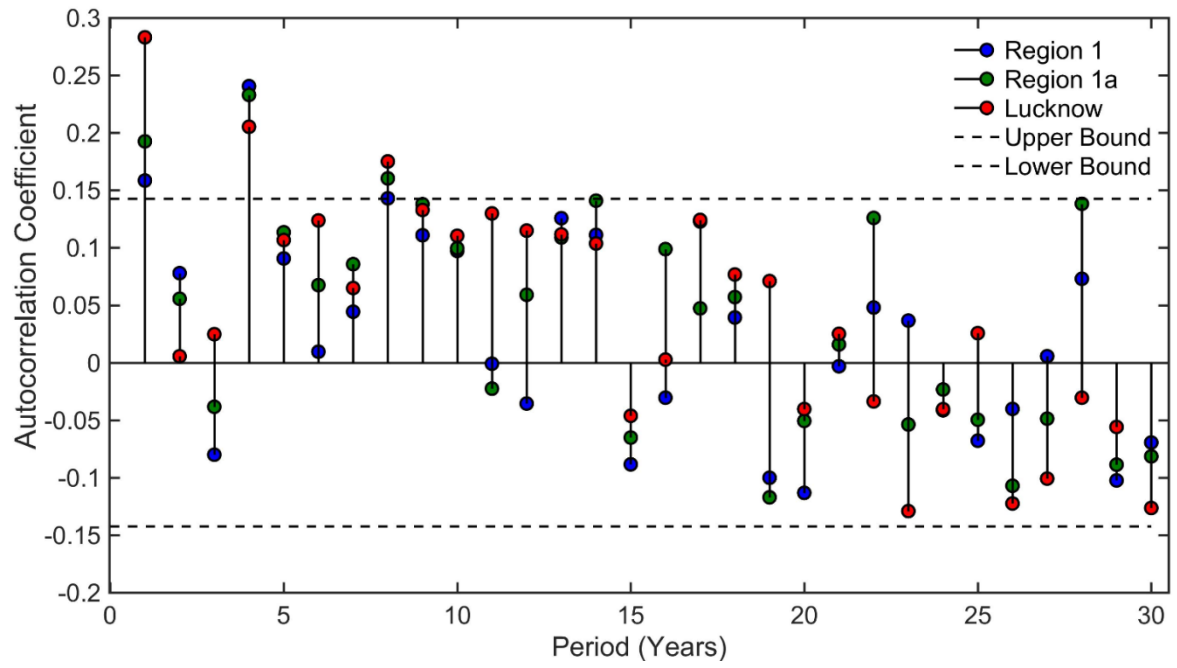
Figure S6. Demonstrating the effect of various periodicities in the trends of DDF in August for Region 1, 1a and Lucknow along with 1 sigma confidence bounds.
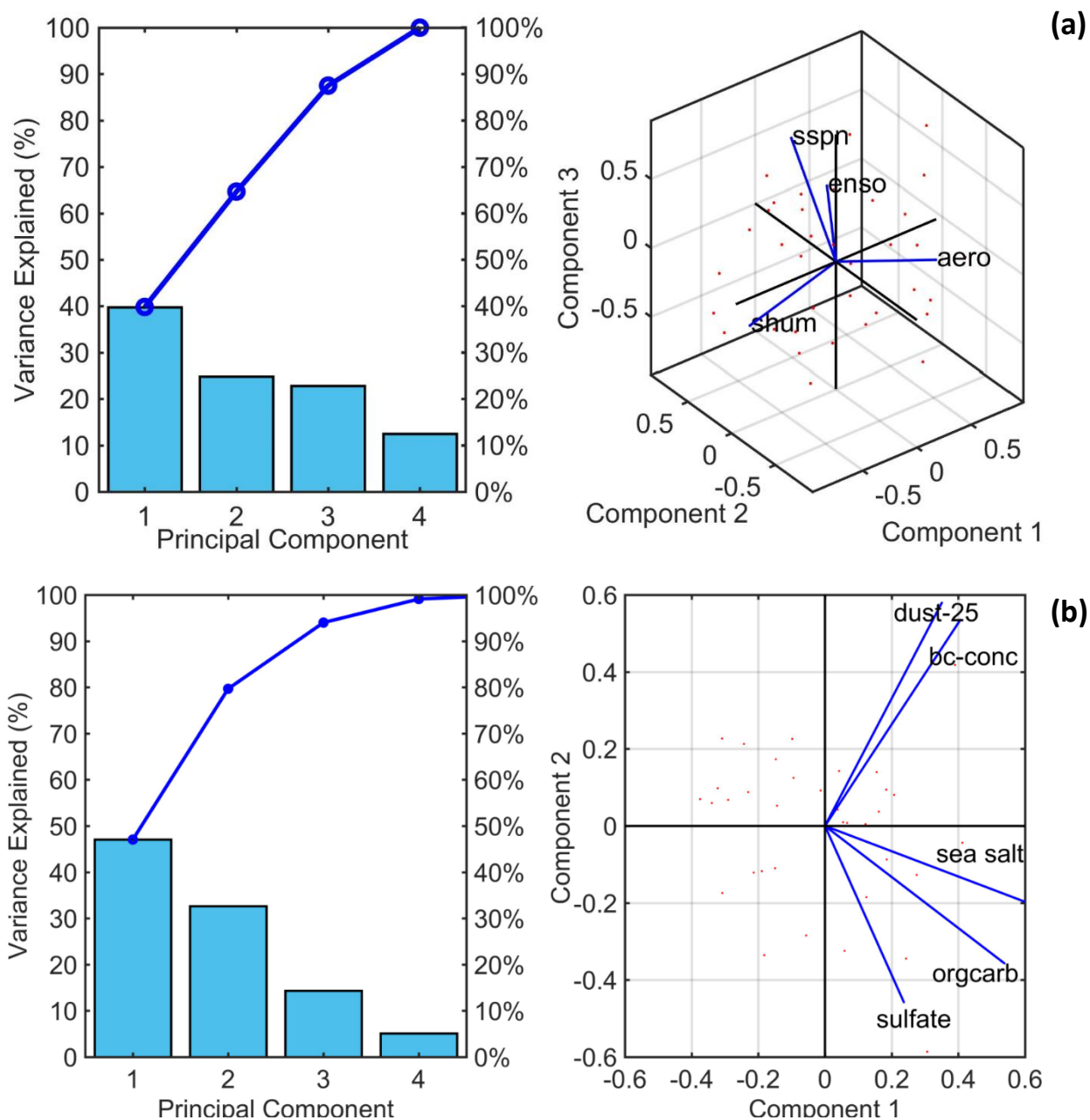
Figure S7. Principle Component Analysis results for various controlling factors on DDF for region 3, (a) using general parameters like total aerosols, SSN, ENSO and humidity (b) Variation of DDF corresponding to 5 aerosol components such as BC, Dust PM 2.5, OC, Sea Salt and Sulphates.
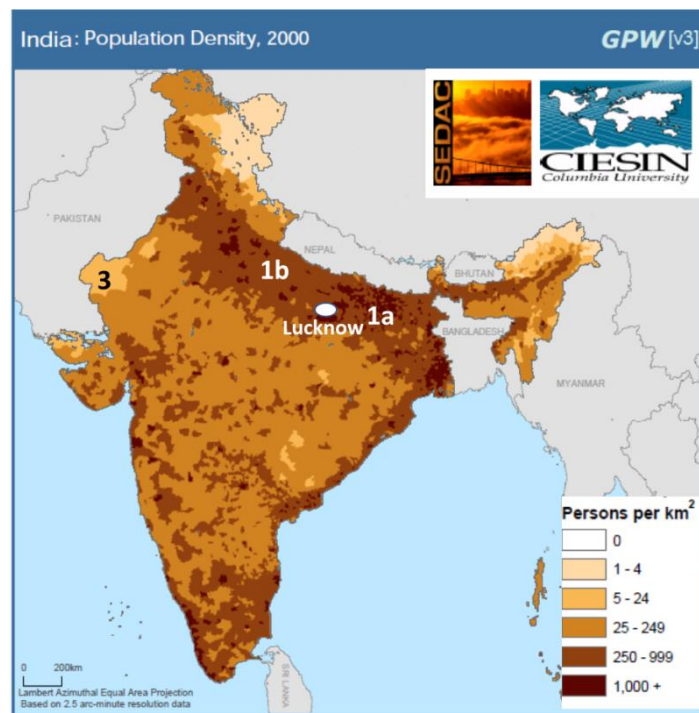
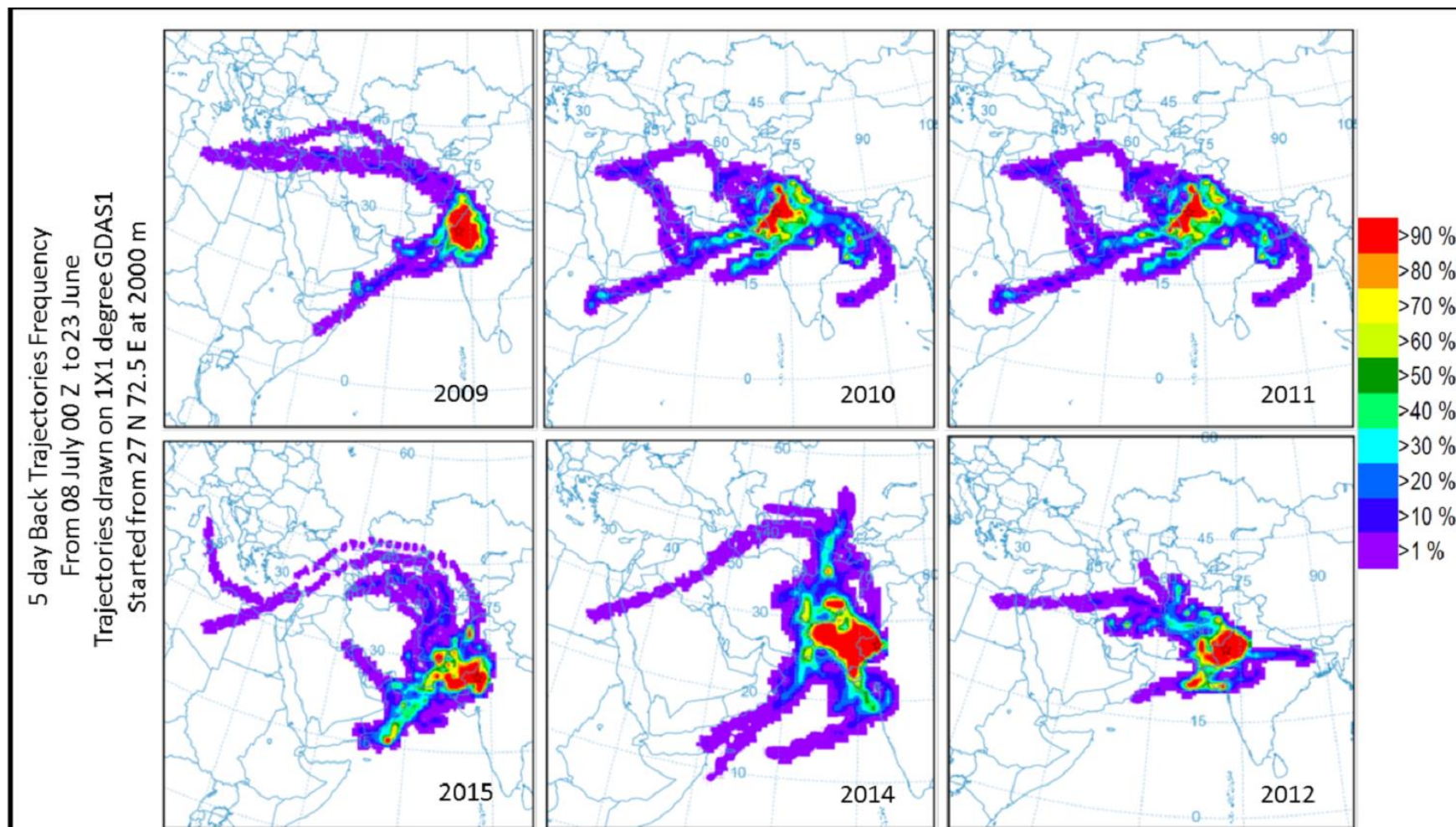**Figure S8.** District-wise average population densities according to SEDAC in 2000.

Figure S9. Frequency distribution of all 5 day back-trajectories computed from 08 July onwards, the first and fourth subpanel indicates years experiencing SDP, second and fifth for those having MDP and third and sixth corresponding to LDP.
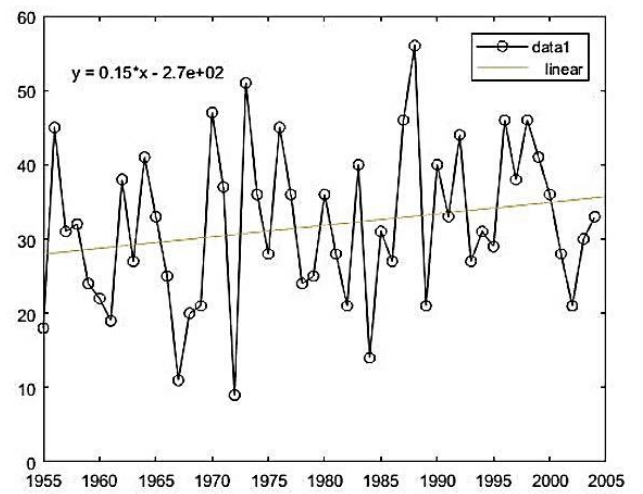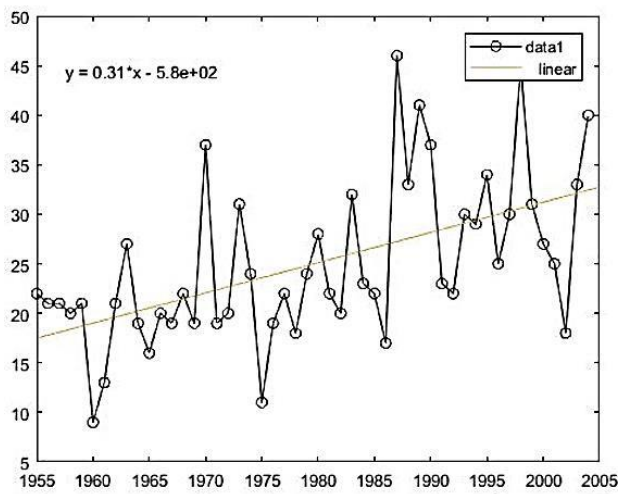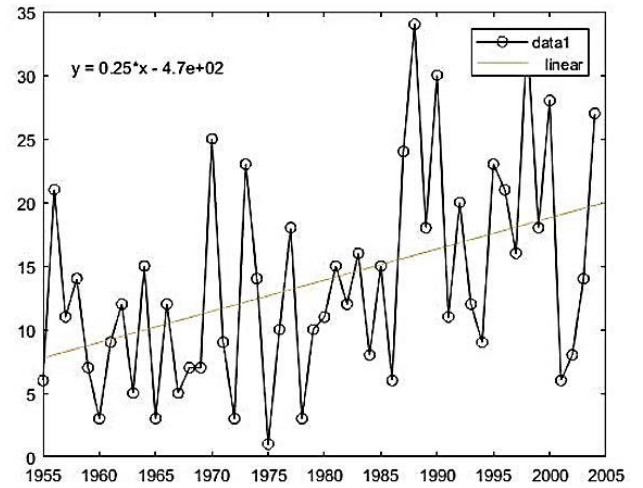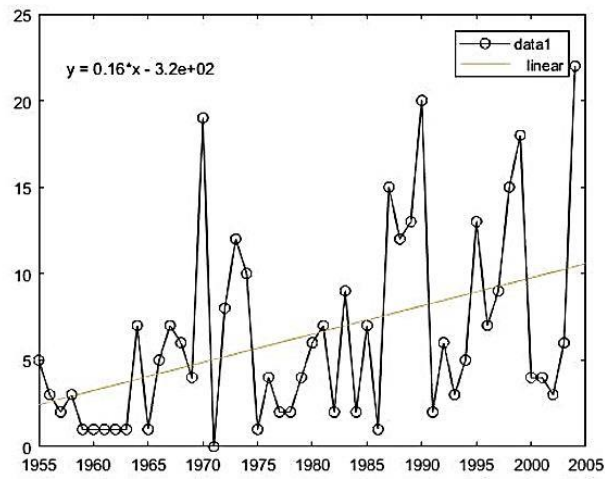
Figure S10. Demonstration of trends in DDF from multi model mean historical datasets of 3 GCMs during 1955-2005.