**Pollution Inferences**

**August 2022**

* PM2.5
  + In J&K + HP + Punjab + Uttarakhand + Haryana, pollution flow is predominantly W.
  + Average gradient strength is 0.38 with a maximum of 1.47.
  + Moderate movement indicates gradual spreading.
  + Highest pollutant levels are observed in Bikaner, Ganganagar.
  + Lowest levels are seen in Kinnaur, Lahul and Spiti.
* PM10
  + In J&K + HP + Punjab + Uttarakhand + Haryana, pollution flow is predominantly SW.
  + Average gradient strength is 0.30 with a maximum of 1.02.
  + Moderate movement indicates gradual spreading.
  + Highest pollutant levels are observed in Amritsar, Kapurthala.
  + Lowest levels are seen in Lahul and Spiti, Kinnaur.
* SO2
  + In J&K + HP + Punjab + Uttarakhand + Haryana, pollution flow is predominantly SW.
  + Average gradient strength is 0.27 with a maximum of 1.36.
  + Moderate movement indicates gradual spreading.
  + Highest pollutant levels are observed in Panipat, Karnal.
  + Lowest levels are seen in Kinnaur, Lahul and Spiti.
* PREC
  + In J&K + HP + Punjab + Uttarakhand + Haryana, pollution flow is predominantly SE.
  + Average gradient strength is 0.39 with a maximum of 1.16.
  + Moderate movement indicates gradual spreading.
  + Highest pollutant levels are observed in Kullu, Chamoli.
  + Lowest levels are seen in Firozpur, Kapurthala.

**October 2022**

* PM2.5
  + In J&K + HP + Punjab + Uttarakhand + Haryana, pollution flow is predominantly W.
  + Average gradient strength is 0.27 with a maximum of 1.07.
  + Moderate movement indicates gradual spreading.
  + Highest pollutant levels are observed in Bikaner, Amritsar.
  + Lowest levels are seen in Kinnaur, Lahul and Spiti.
* PM10
  + In J&K + HP + Punjab + Uttarakhand + Haryana, pollution flow is predominantly SW.
  + Average gradient strength is 0.32 with a maximum of 1.00.
  + Moderate movement indicates gradual spreading.
  + Highest pollutant levels are observed in Sonipat, Jind.
  + Lowest levels are seen in Ladakh, Kinnaur.
* SO2
  + In J&K + HP + Punjab + Uttarakhand + Haryana, pollution flow is predominantly SW.
  + Average gradient strength is 0.26 with a maximum of 1.01.
  + Moderate movement indicates gradual spreading.
  + Highest pollutant levels are observed in Sonipat, Rohtak.
  + Lowest levels are seen in Ladakh, Gilgit.
* PREC
  + In J&K + HP + Punjab + Uttarakhand + Haryana, pollution flow is predominantly SE.
  + Average gradient strength is 0.49 with a maximum of 1.67.
  + Moderate movement indicates gradual spreading.
  + Highest pollutant levels are observed in Almora, Pithoragarh.
  + Lowest levels are seen in Firozpur, Bikaner.

**2022 (Complete year)**

* PM2.5
  + Winter/Post-Monsoon Pollution Peak: Late autumn and winter (October-February) consistently show the highest pollution, with deep red colors concentrating in the southern plains.
  + Monsoon Relief: Pollution dramatically decreases across the entire region during the monsoon months (July-August), shifting to predominantly green and light yellow.
  + Plains vs. Hills Gradient: The southern plains consistently experience higher pollution levels compared to the northern hilly regions, with this difference being most pronounced during high-pollution seasons.
  + Northward Dispersion: A dominant trend shows pollution moving northward or northwestward from the southern plains towards the Himalayan foothills, especially during the high-pollution periods.
* PM10
  + Winter and post-monsoon (Oct-Feb) consistently show the highest pollution, concentrated in the southern plains with deep red colors.
  + Pollution dramatically decreases across the region during monsoon months (July-August), with maps showing predominantly green and light yellow.
  + Southern plains consistently experience higher pollution levels compared to the northern hilly regions; this difference is most pronounced in high-pollution seasons.
  + A clear trend shows pollution moving northward or northwestward from the southern plains towards the Himalayan foothills, especially during periods of high pollution.