Forms of Precipitation

Precipitation manifests in various forms depending on **temperature**, **humidity**, and **altitude**:

1. **Rainfall** is the most common and vital form, resulting from the hydrological cycle. It occurs when water droplets coalesce and fall. A day with **≥2.5 mm** rainfall is termed a **rainy day**.
2. **Drizzle** consists of very fine droplets (diameter <0.5 mm), often originating from **low stratus clouds**. It is light, continuous, and often **does not reach the ground**.
3. **Snow** forms by the **crystallization of water vapor** at temperatures below freezing through **sublimation**. It serves as an insulating cover in **cold climates**, protecting the soil and plant roots.
4. **Hail or Hailstorm** consists of **hard ice pellets** ranging in size from peas to cricket balls. Formed in **cumulonimbus clouds**, hail is more frequent in **temperate zones** and can cause **significant damage** to crops and infrastructure.
5. **Sleet** comprises **clear ice pellets** formed when raindrops freeze while passing through a layer of cold air. It requires a **temperature inversion** and may result from melting hail or freezing rain.
6. **Glaze** or **freezing rain** occurs when **supercooled water droplets** freeze upon contact with cold surfaces, forming a smooth layer of ice. Glaze is hazardous as it can **break tree limbs**, **power lines**, and **cause accidents** due to slippery surfaces.

Fig. 19.2. Some common forms of precipitation (Courtesy – science notes)

Precipitation form	Precipitation size	Precipitation state
Rain	0.5 to 5mm	Liquid
Drizzle	<0.5mm	Liquid
Snow	1mm to 2cm	Solid
Glaze	1mm to 2cm	Solid layer
Sleet	0.5 to 5mm	Solid
Hail	5mm to 10cm+	Solid

Some rare or mixed forms of precipitation include **rain and snow mixed (RASN)**, often called *slush*, which is a soft blend of frozen and melted water, unlike hard **sleet**. A similar mix can occur with **drizzle and snow (DZSN)**. In some cases, precipitation **evaporates before reaching the ground**, a phenomenon known as **virga**. An intense downpour over a short duration is termed a **cloudburst (CB)**, which may include **hail**. Another rare occurrence is the **megacryometeor**—a massive chunk of ice, weighing from **0.5 to over 50 kg**, not necessarily linked to thunderstorms, but possibly to **tropopause fluctuations**. These ice masses can cause damage similar to **meteors**, sometimes leaving **impact craters**.

Forms of Condensation Related to Precipitation

Condensation leads to cloud formation and often precedes precipitation. Common **condensation forms** include:

1. **Dew:** Forms when moisture condenses on cool surfaces. In arid regions, dew has **agricultural importance**, as it can be **absorbed by plants**.
2. **Frost:** Occurs when the dew point is **below 0°C**, and vapor directly **sublimates into ice** on surfaces. Frost is common in cold climates and affects **crop growth**.
3. **Fog:** A **low-lying cloud** formed by condensation near the surface. It reduces **visibility** and may consist of water droplets or ice crystals. **Smog**, a mix of **smoke and fog**, is a major **air pollutant** in urban areas.