Long Range Outlooks
ENSO, Arctic Oscillation, & Teleconnections

Long Range Outlooks: General trends of Temperature and Precipitation as compared to Normal or Averages. One week to two weeks. Monthly to Seasonally.

ENSO = El Nino Southern Oscillation
El Nino conditions occur in the Equatorial Pacific when there is a departure from "normal" Sea Surface Temperatures (SST). This is caused by a weakening pressure gradient between the eastern Pacific & western Pacific, and *weaker easterly trade winds* allowing warmer surface water to surge eastward, replacing normal cooler water off the coast of South America.
-- Typically, during El Nino winters, the SW U.S is cooler & snowier & NW U.S. is warmer & snowfall can be up or down. In Alaska, temps are usually warmer & snowfall can be up or down.

La Nina conditions occur when *easterly trade winds are stronger*, causing cooler water in the eastern Pacific to spread westward, and is also deflected north & south of the equator, allowing the upwelling of even colder water to replace it.
-- Typically, during La Nina winters the NW U.S. is cool & snowfall is above normal. SW U.S us warm & dry. In Alaska, temps are usually cooler, and snowfall can be above or below normal.

El Nino = Warmer than Normal Sea-Surface Temps across the Equatorial Pacific
La Nina = Colder than Normal Sea-Surface Temps across the Equatorial Pacific
No Nino (Neutral) **=** Normal Sea-Surface Temps across the Equatorial Pacific.

Arctic Oscillation (AO): A measure of the difference in pressure (at Sea Level or 500mb) between the Northern Polar Regions & Mid-Latitudes. Positive & Negative Phases.

Positive AO= Lower Pressure over Arctic & Higher pressure Mid-latitudes.
Forces jet stream & storm track further North.
Colder air in Arctic, warm air Mid-Latitudes. More storms for Alaska.

Negative AO= Higher Pressure over Arctic & Lower pressure Mid-latitudes.
Forces jet stream & storm track further South.
Warmer air in Arctic, colder air Mid-Latitudes. More storms for Mid-Latitudes.

Pacific - North American Oscillation (PNA):
Examines difference in upper level heights (700 & 500mb) between the North Pacific & Southeastern U.S. Found to be strongly influenced by ENSO, positive PNA's are found during El Nino, negative PNA's are found during La Nina.

Positive PNA: East Asian Jet stream stronger, more Lows form near Aleutians.
Negative PNA: East Asian Jet stream regresses, more Highs form over Alaska.

Note: There is also a North Atlantic Oscillation & an Antarctic Oscillation

Teleconnections: ENSO & Arctic Oscillations both have an effect on global circulations, while they do not directly cause the weather, they do have an influence on the prevailing pattern, which can lead to certain trends that might persist for months to a couple of years. The effects of ENSO & AO events are most noticeable during Northern Hemisphere winters.
**Different combinations of ENSO & AO phases will complicate global weather patterns even further!*