Euporias Master Class

The Predictability
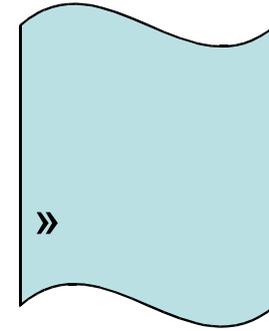
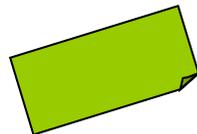**METEO FRANCE**
Toujours un temps d'avance

The Predictability

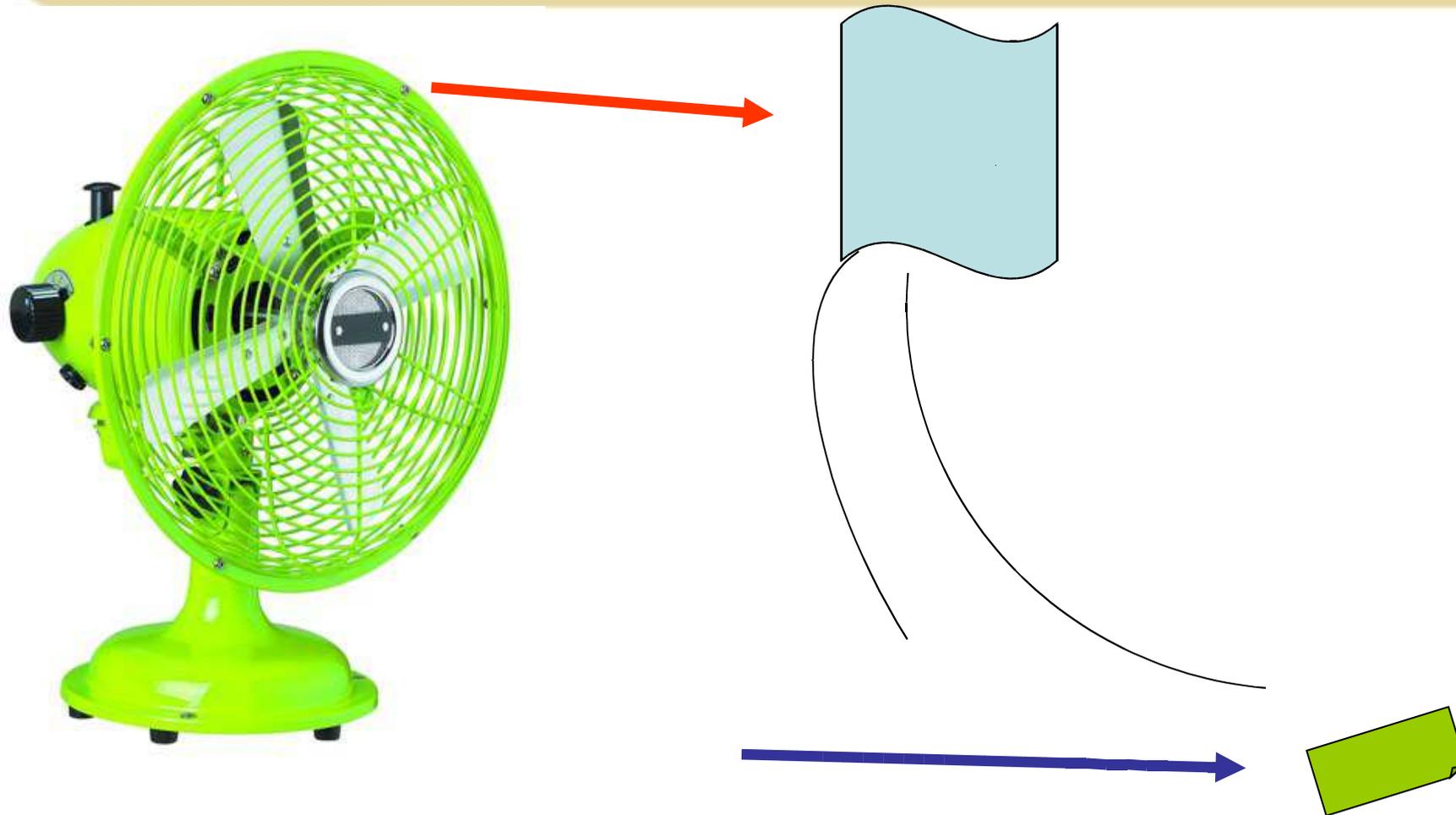« The paper sheet will land … **on the mark at the ground** »

➤ **Not realistic, we can't trust such kind of forecast**

« The paper sheet will land …. **likely « close to »** the mark at the ground

➤ **More realistic ; one can better trust such kind of forecast**

The Predictability

« The paper sheet will land …. **likely on my left** »

The Predictability

Pacific

Atlantic

Indian Ocean

?
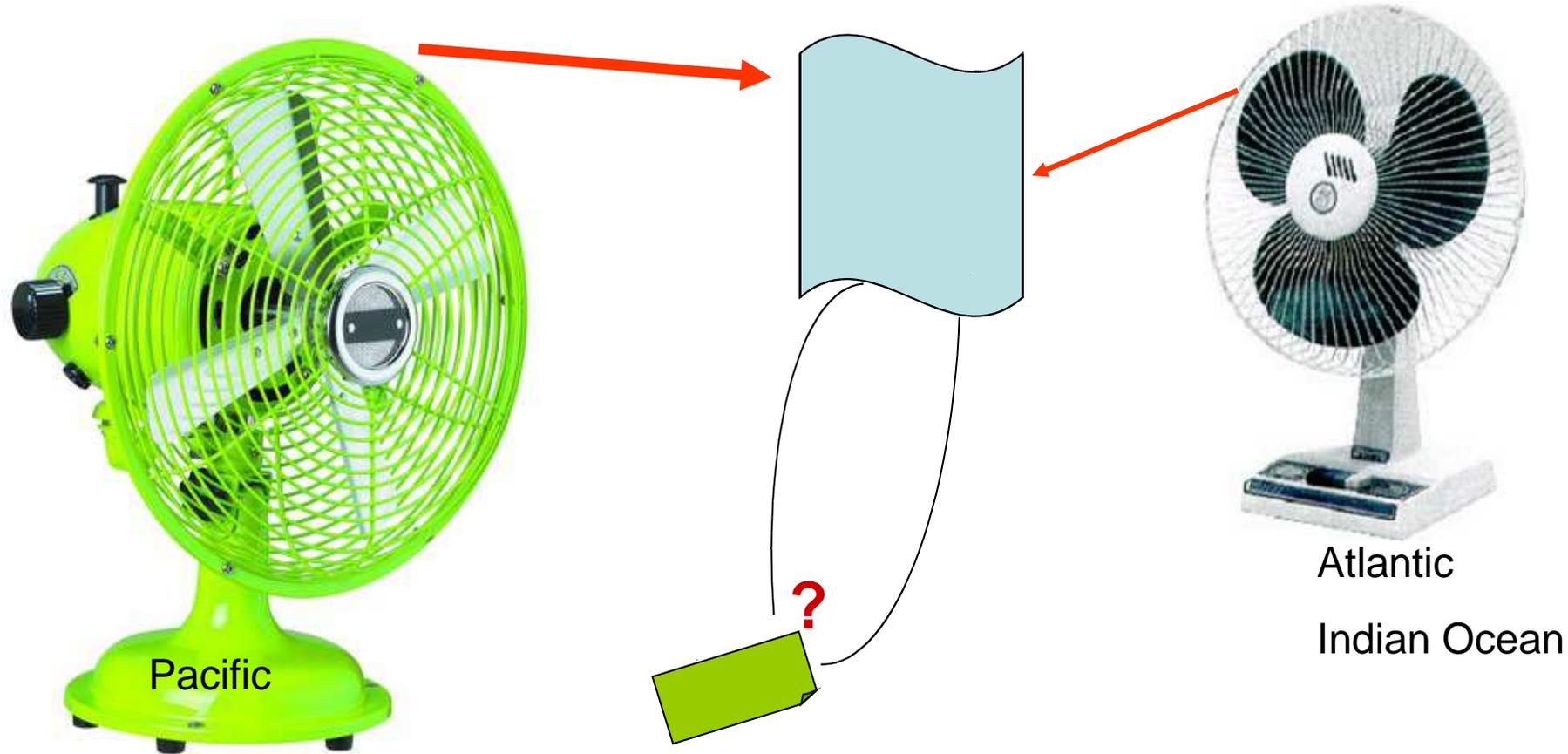
In the climate system there are several « fans » ; especially the
Pacific but also the Indian Ocean and the Atlantic
They can interact so that the regional / local signal can be
sthrengthened or weakened

The Predictability

The predictability depends on :

- The **scale of the phenomenum** that must be forecasted (thunderstorm,fog,mid-latitude cyclone, trade wind, ENSO, ...)

- The **range of the forecast** used to forecast (hour, day, week, month, season, etc.)

In the nature it exists **a strong linkage between the time and space scales**

Seasonal forecast ⬌ Large Scales

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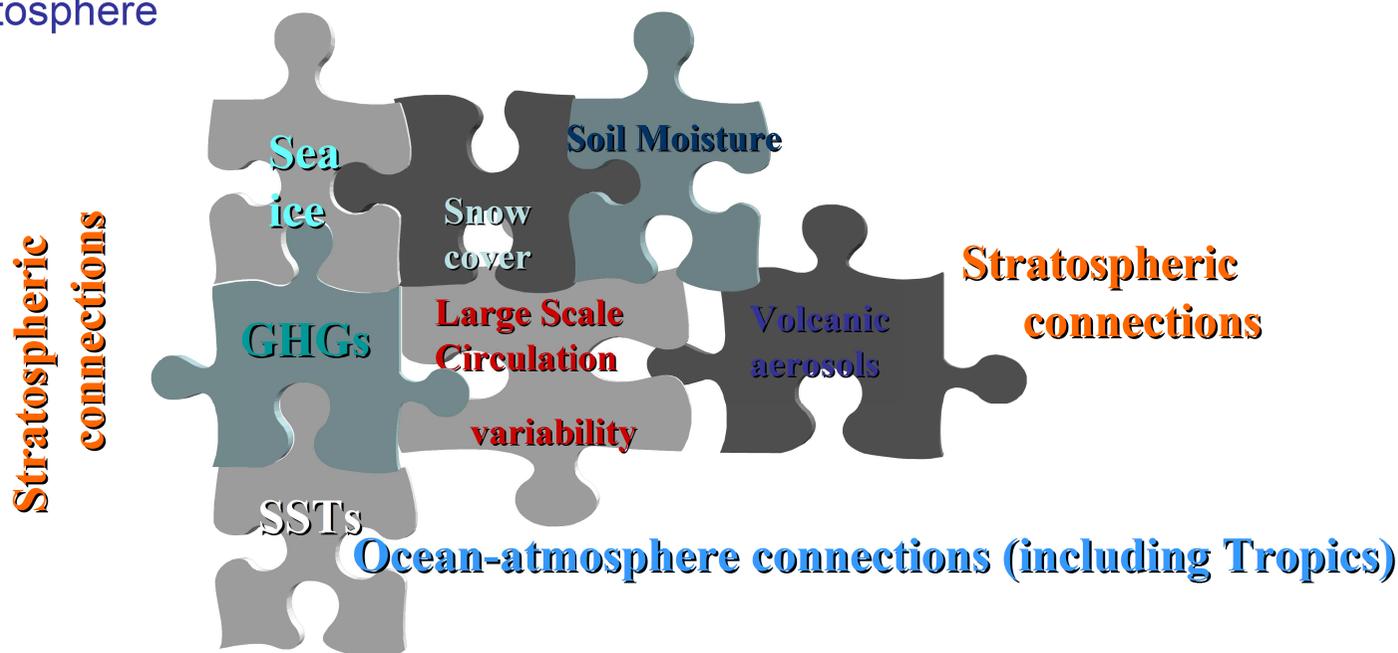
Which are the concerned phenomenum ?

■ Large Scale Phenomenum corresponding to persistent modifications of the General Circulation of the Ocean/Atmosphere system and to their potential impacts :

- Intensity of the Trade Wind over the tropical oceanic basin,
- El Niño or La Niña and their consequences,
- Tropical Cyclonic Activity over the topical oceanic basins,
- Circulation Regimes over the North Atlantic sector,
- …

The predictability

Sources of Predictability in the climate system

- **Slow Components which impact the system at the climate time scales (a few weeks to a few years) and reasonably well simulated by climate models**
  - ➢ Oceans and Sea Ice
  - ➢ Continental Surfaces (Biosphere, Cryosphere, Soil Moisture, …)
  - ➢ Feedback processes (coupling of components of the climate system)
  - ➢ Stratosphere

Sea ice

Soil Moisture

Snow cover

Large Scale Circulation variability

GHGs

Volcanic aerosols

SSTs

Stratospheric connections

Stratospheric connections

Ocean-atmosphere connections (including Tropics)

Sources of predictability of the Climate System

Thanks to Roxana

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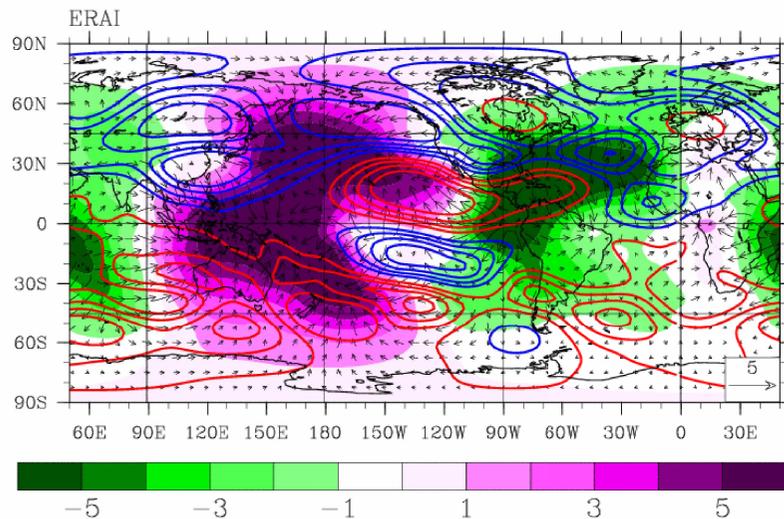
Reliability and Skill

How can we detect the predictability ?

Analyse of the reaction of the atmosphere in the Tropics (direct and indirect action of SST) and beyond (especially via teleconnections to mid-latitudes)

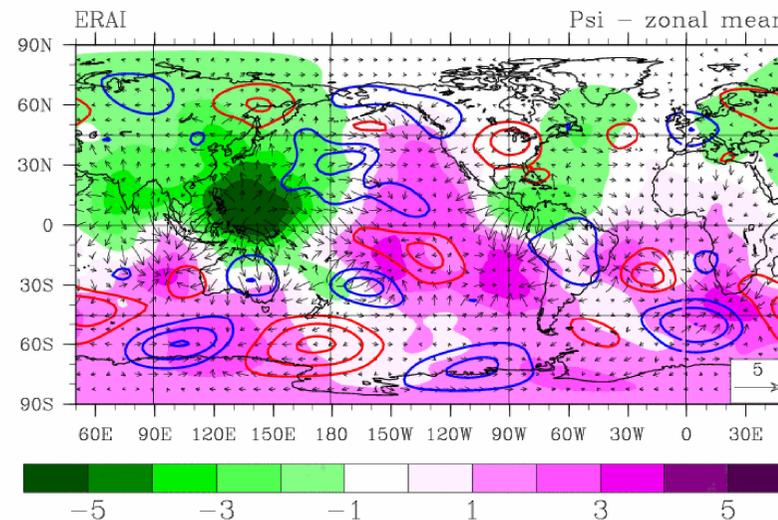Some periods where the predictability is :

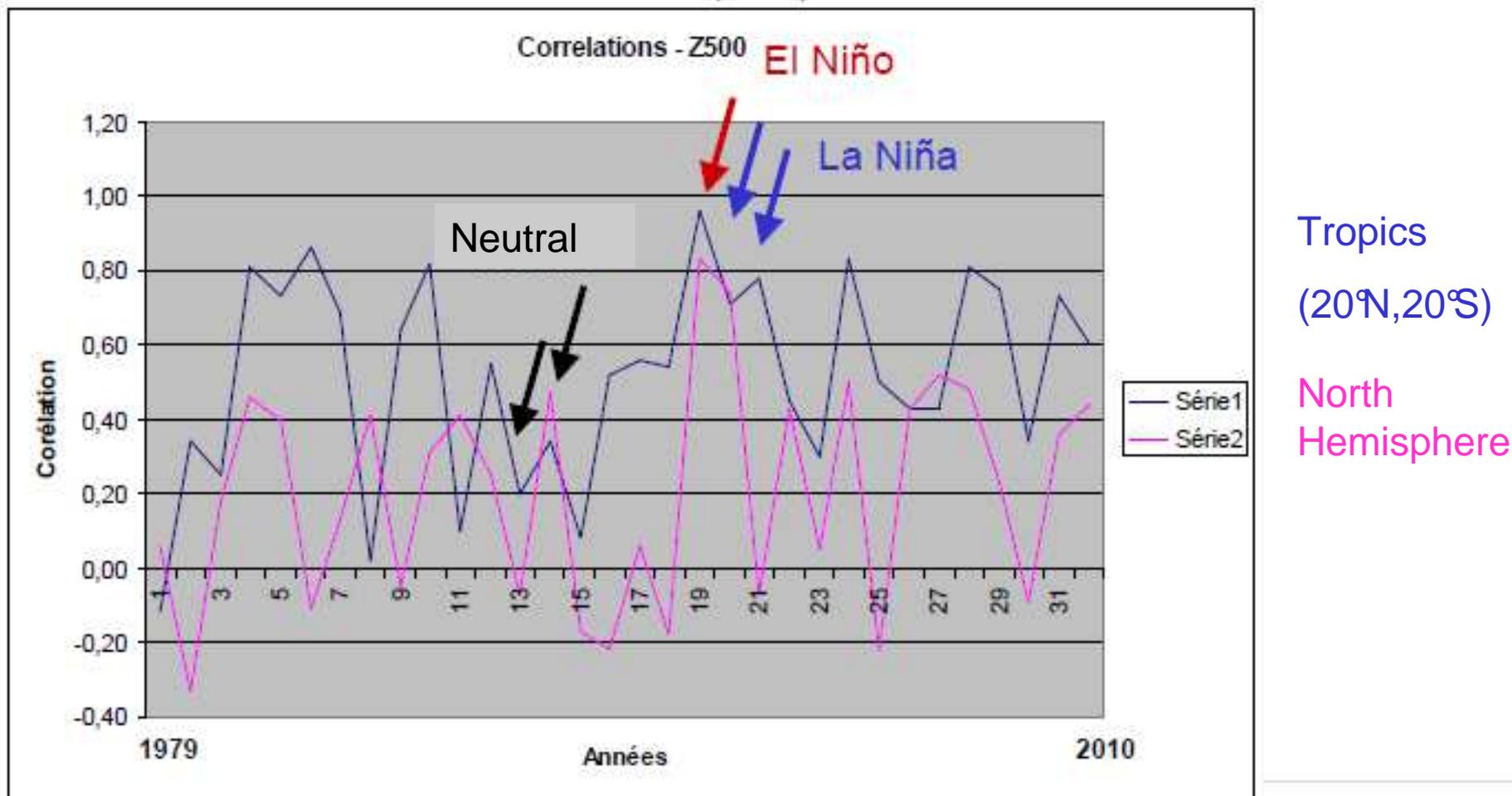« Good »   « Weak »

Observations (analyses) in the high troposphere of the components of the atmospheric circulation

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Reliability and Skill

- **Quality of the forecasts vs years (Geopotential Heigh)**
  Winter season (DJF)

Correlations - Z500 El Niño / La Niña / Neutral

Tropics (20N,20S)

North Hemisphere

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Predictability, Reliability and Skill

- **Predictability depends on the large scale forcing and the regional climate drivers acting over the region of interest**

- **Predictability is « natural » but often diagnosed through model scores and skills**

- **Current Predictability depends on the current state of the climate**

- **Reliability and skill of forecasts depends on the current and general predictability**

- **Reliability and skill depend on the region and the parameter,**

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