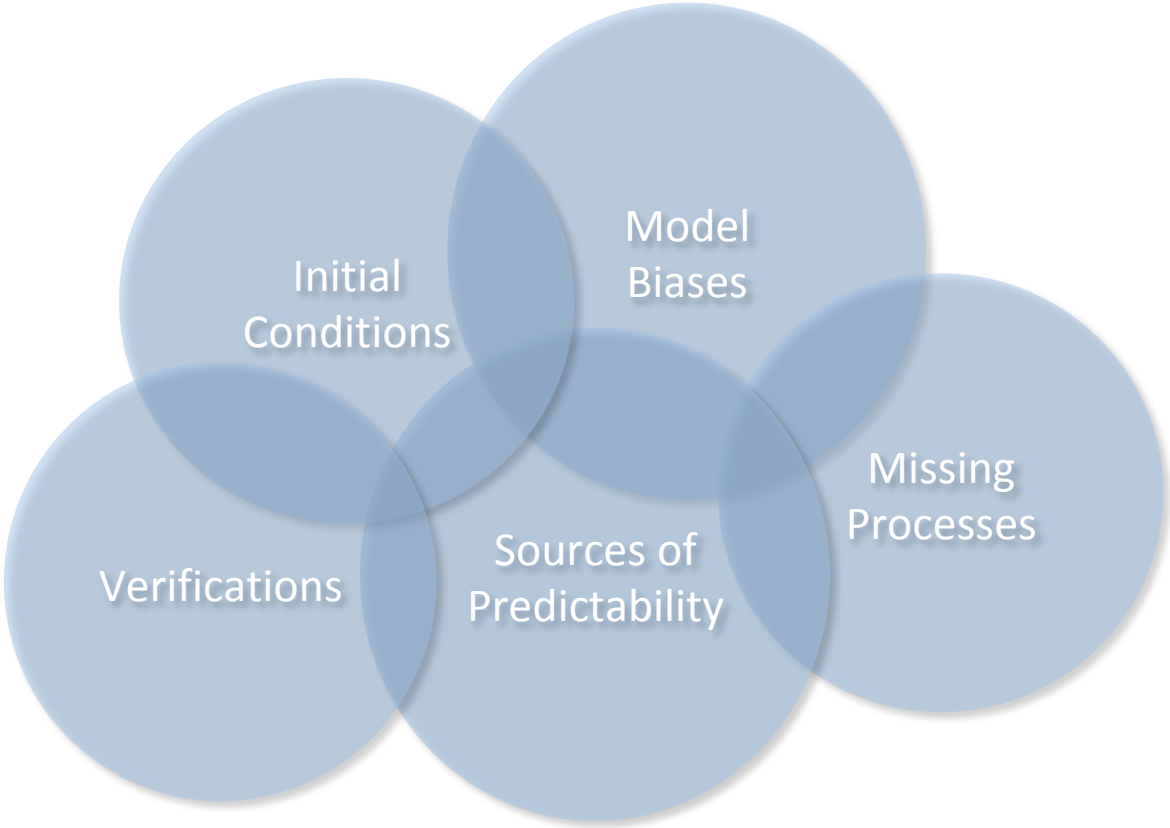
How can prediction of high impact events on sub-seasonal to decadal timescales be improved? (with WGNE, WGSIP, DAOS, PDEF, S2S)



How can prediction of high impact events on sub-seasonal to decadal timescales be improved? (with WGNE, WGSIP, DAOS, PDEF, S2S)

Better quantifying atmospheric model biases and their impacts

- How would model biases influence stratospheric prediction?
- How would biases in representation of atmospheric mean state and variability (e.g., polar vortex, QBO, etc.) impact prediction of teleconnection, MJO, NAO, storm tracks, extreme events, etc.?

Identifying the missing processes in the model that limit predictability

- How high would model top (e.g., mesosphere) need to be for improved prediction?
- At what time scales, middle atmosphere affects the predictability?
- How important is atmospheric composition (e.g., interactive ozone chemistry and aerosol) in S2D prediction?
- How do small-scale waves affect the prediction?
- How do interaction of processes across the time scales affect the prediction?

Process-level understanding of sources of predictability

- How do we identify the window of opportunity (weak/strong vortex state, MJO, QBO, etc.)?
- How can we attribute where the prediction skill comes from?
- Are there untapped sources of atmospheric predictability?

Reducing uncertainties in initial conditions for improved prediction

- Do the quality and uncertainty of initial conditions in the stratosphere and mesosphere matter?
- What observations (and data assimilation systems) do we need to improve initial conditions?
- On what time scales, are atmospheric initial conditions important?

Process-oriented model verification

- Do we need new observations (e.g., AEOLUS) and long time series to better verify the S2D models?