Biases

- Too-strong indirect effect
- Collapsed OH in tropical PBL
- Short methane (and CO) lifetime
- Low SOA burden
- Low aerosol concentrations near the poles, particularly for BC
- Low aerosol absorption optical depth in many regions
- High summertime surface ozone (US/Europe)

Science questions

- What are the impacts of short-lived climate forcers (anthropogenic aerosol, ozone and methane) on the past, present and future global and regional climate?
- What is the impact of aerosol and ozone deposition on surface biology?
- How much does climate-wildfire feedback contribute to climate variability?
- What is the role of climate-dust feedback? How strong is the climate-DMS feedback?
- What are potential impacts of engineered aerosol on tropospheric and stratospheric chemistry?
- How is tropospheric chemistry affected by the ozone recovery and changes in stratospheric residual circulation?
- What were the changes in tropospheric oxidants since pre-industrial times and expected changes in the future?
- What is the role of anthropogenic pollutants on the formation of secondary-organic aerosols?

Metrics and diagnostics

- Metrics - A quantifiable comparison to observations that results in an objective "score" (with uncertainty if possible)
- Diagnostics - Inspection of model biases/behavior. These may include difference maps to observed fields, subjective visual assessment of fields for which observations may not be available for easy and direct comparison, etc.