Introducing Review Activity Area 1:
Climate Science / Earth System Science and Modeling

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Advance understanding, modeling, prediction, and projection of the Earth’s atmosphere, ocean, land, and cryosphere as an integrated system, including:

- Process studies and field campaigns
- Earth system observations and monitoring
- Predictability studies of climate phenomena
- Testing for transitions of R2O and R2A
- Improving model representations of key processes and prediction technologies
- Lead national assessments
- Applying Earth system and climate models to societally-relevant challenges
- Projecting future climate variability & change
- Coordinating joint federal research activities
Key Programs in Activity Area 1

Pre-recorded Presentations

- Atmospheric Chemistry, Carbon Cycle, and Climate (AC4) Program
  Presenter: Monika Kopacz
- Climate Observations and Monitoring (COM) Program
  Presenter: Virginia Selz
- Climate Variability and Predictability (CVP) Program
  Presenter: Sandy Lucas
- Earth Radiation Budget Program (ERB)
  Presenter: Greg Frost
- Modeling, Analysis, Predictions and Projections (MAPP) Program
  Presenter: Dan Barrie
**Scope and Key Accomplishments**

**Dataset Development and Analysis**
- Observational dataset development and analysis
- Use of existing observations to improve climate understanding, modeling, monitoring and assessments

**Modeling**
- Climate Process Teams (CPTs) connecting observations, theory and modeling
- High-resolution global coupled modeling
- Process-level model diagnostics

**Understanding**
- Understanding of mechanisms and predictability on S2S to decadal timescales
- Attribution of climate extremes
- Process-level understanding/modeling
- Field experiments (FIREX, YMC, ATOMIC)
- Lab studies

**Predictions, Projections & Applications**
- CMIP analyses contributing to National Assessments
- Exploring applications for sea level, marine ecosystem and sea-ice predictions
- Drought understanding, monitoring and outlooks
- Research on air quality prediction
- R2O and R2A transitions (NMME)

- **Contributing to key NOAA initiatives** (Climate and Fisheries Initiative; Coastal Inundation at Climate Timescales; Precipitation Prediction Grand Challenge (PPGC))
- **Leading two and contributing to all four of the CPO risk area teams**
Best Practices to Achieve Goals in Activity Area 1

- **Decide research priorities to address administration and NOAA’s priorities and to contribute to CPO risk areas in collaboration with NOAA labs/centers and external research communities**

- **Support highest-quality, higher-performing research projects through the competitive and proposal-driven process**

- **Complement and accelerate OAR Lab research** by exploring new frontiers, fostering discovery, “filling gaps”

- **Operate through annual solicitation** to ensure new research areas, and support high-risk, high-reward investments

- **Facilitate coordination and collaboration with** the NOAA Labs/Centers, US agencies and national/international research communities
Future Strategic Considerations:

- Does the portfolio in Activity Area 1 cover the right science topics?
- What are the nice fusion opportunities between user demand-side needs and foundational science?
- What is the ideal balance between complementing research across NOAA (within OAR and cross-LOs) vs. exploring newer research areas?
- With increased climate budgets, should CPO/ESSM deepen funds for current research areas or expand to broader research areas, e.g. terrestrial and oceanic biogeochemistry research?