NOAA Global Systems Laboratory

Leading Collaborative Programs

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Global Systems Laboratory

Leading Multi-Lab Collaborative Projects

- Atmospheric Science for Renewable Energy (ASRE) Program
  - Initiated in late 2010
  - $2.8 M annual budget
  - Includes participants from Physical Sciences Lab (PSL), Global Monitoring Lab (GML), Chemical Sciences Lab (CSL), and Global Systems Lab (GSL)

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- Boundary Layer Program
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  - Average $800K annual budget
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- Fire Weather Program
  - New program being developed in last 8 months
  - Potentially a $25M annual budget
  - Involve most OAR labs, as well as NESDIS and NWS

Atmospheric Science for Renewable Energy

- An integrated, multi-lab, applied research program; was initiated in 2010
- Improve downwelling solar and surface-to-300m wind forecasts, especially in the 1 to 48 h forecasts from the HRRR
- Strong emphasis on boundary layer turbulence and subgrid-scale clouds

- Constraint is “do no harm” to the convective forecasts
- Over 35 published papers with multi-lab authorships since 2016
- ASRE efforts span the technical readiness range and facilitates R2O

Collaboration with Department of Energy

- DOE Office of Energy Efficiency and Renewable Energy (EERE) Wind Energy Technology Office (WETO) is major partner
- WETO supported Wind Energy Forecast Improvement Projects (WFIP)
  - WFIP-1: in 2011-12, focus on data assimilation
  - WFIP-2: in 2016-17, focus on complex terrain
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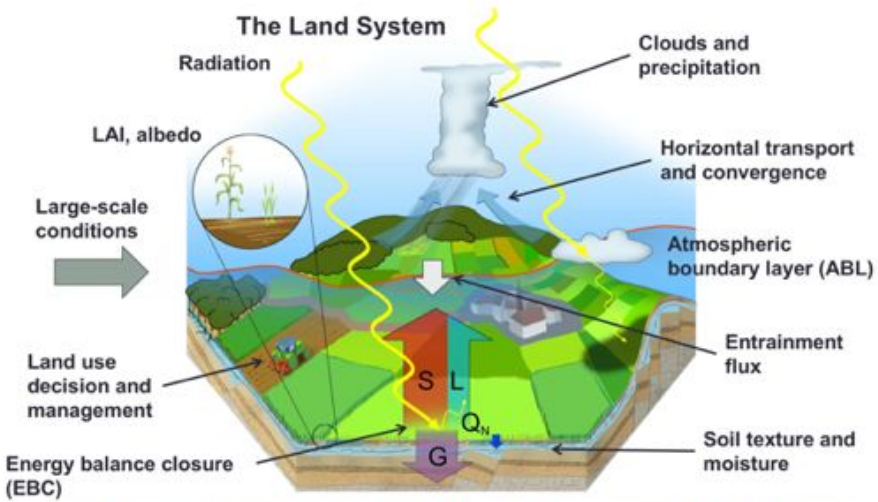
- Building relationship with EERE Solar Energy
- Long-term relationship with DOE Office of Science via Atmospheric System Research and Atmospheric Radiation Measurement programs
- ASRE helps facilitate DOE supported work into NWS operations

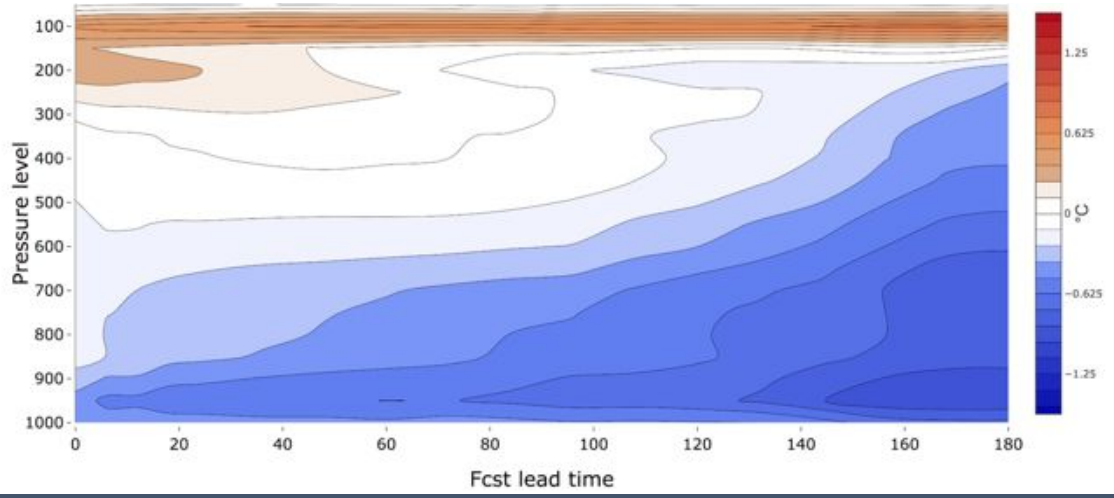
Boundary Layer (BL) Program

- All OAR laboratories have research interests in the BL
- Significant errors in Global Forecast System (GFS) weather forecasts due to errors in BL physics
- Research tools (instruments/models) distributed across the OAR lab system
- Joined other agency efforts
  - NSF-funded effort in 2018-20
  - Plan on joining DOE-funded effort in 2020-22



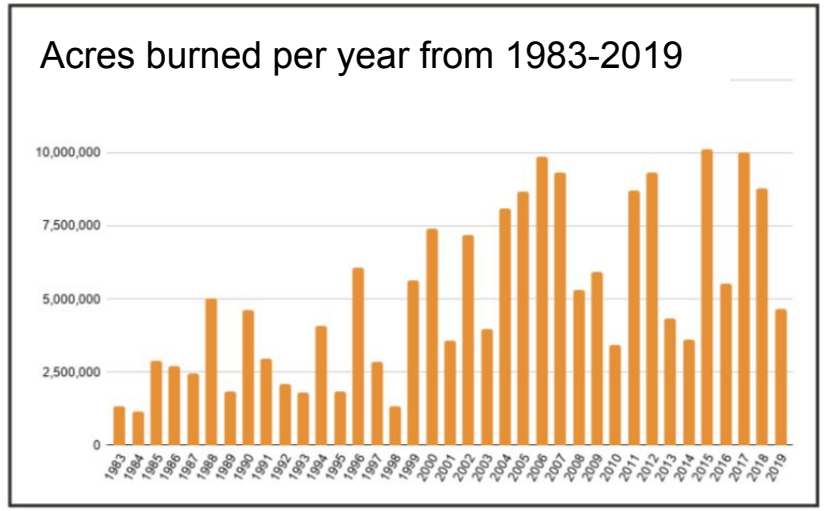
Water and energy budgets are results of feedback processes in the LA system

GFS Temperature Bias, CONUS, 1 Oct 2019 – 19 Nov 2019



Fire Weather Program

- Strong desire to better understand/predict wildfire - weather interactions
  - GSL is leading NOAA-wide effort to support Congressional request
  - Integrating efforts across OAR, NESDIS, and NWS
  - Developing Fire Weather Testbed to facilitate R2O



- Developed briefings for Congressional staff, other agencies
- Developed short-term (1-2 yr) spend plan and program change summary for next 5-10 yr
- Research includes: coupled fire-weather modeling, fire emissions and air quality impacts, subseasonal-to-decadal prediction, products and tool development for operations, ...

Summary of Community Activities

Performance

- Leadership of multi-lab projects
- Development of science plans
- Facilitating collaboration
  - Science boards
  - Workshops
  - Regular meetings
- Field campaigns

Quality

- Dozens of multi-lab authored papers
- Improved models to NWS operations
- Giving invited and keynote presentations

Relevance

- Multi-lab, cross-line office, cross-agency to improve NOAA R2O
- Community engagement
- Responding to national needs