

CSES: Center for Space and Earth Science



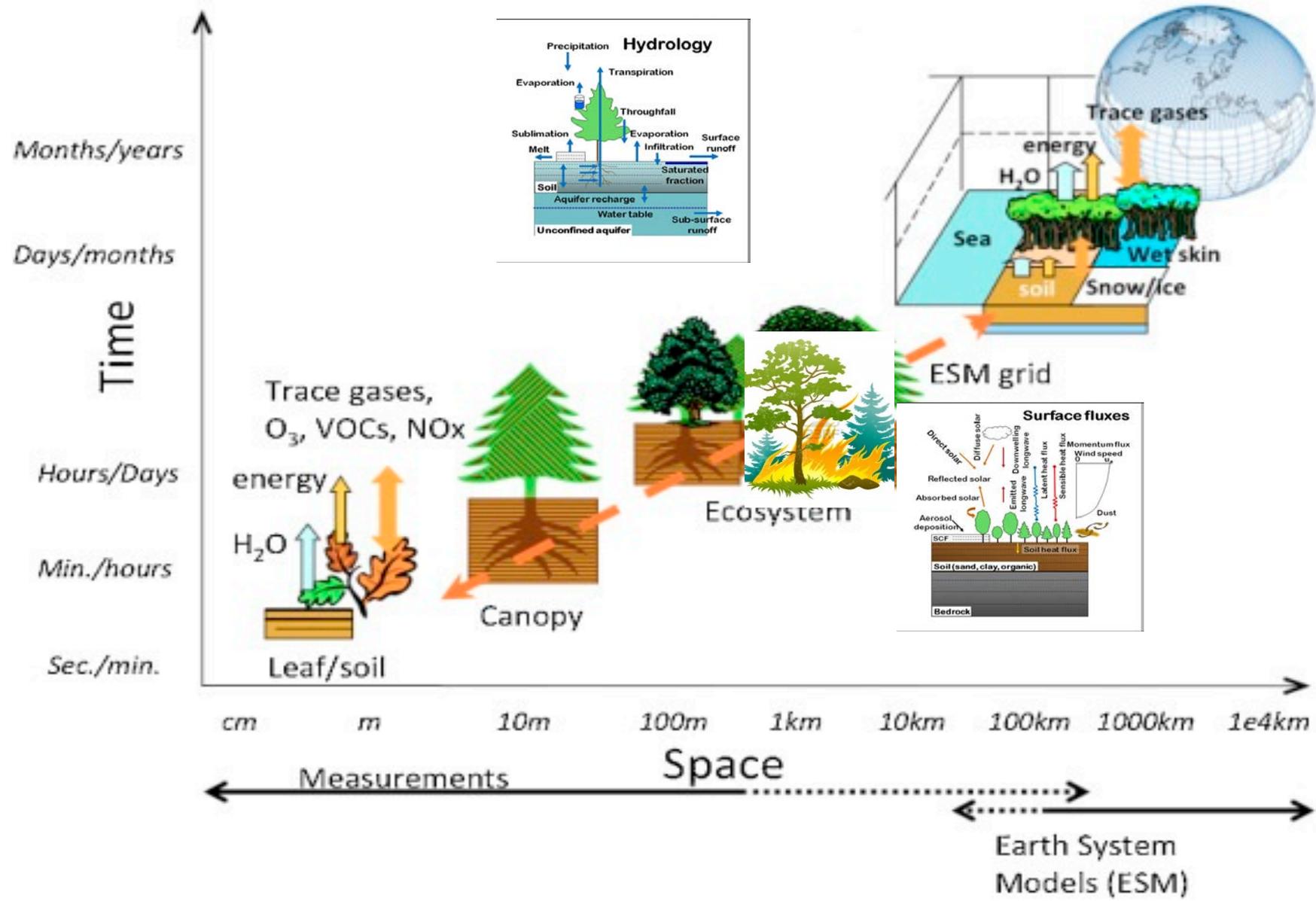
Earth Systems Focus Area

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Earth System Observations, EES-14

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Earth Systems science covers large range of scales



FY2020 Call Topics

Signatures: Revolutionary sensors, and novel use of sensor networks, existing datasets or omics' approaches for identifying signatures of change or interaction between components of complex natural systems.

- 1) Signatures of interaction, and function of regulatory systems in and between single cells and their environment, or the microbiome and their environment, and other organisms.
- 2) Signatures of atmospheric, biogeochemical or hydrological change in sensitive regions or during and after extreme or catastrophic events that allow prediction of rate of change or identification of potential system tipping points.

Complex coupled processes: Integration of models and observations, or field and laboratory studies to improve, and develop missing physics parameterizations that will improve capability to predict system responses to change at multiple scales

- 1) In coupled ocean-land-ice-atmosphere processes at the coastal interface and high latitudes
- 2) In response to extreme or catastrophic events such as drought, fire, epidemics

System security and resilience: Development of novel experimental, modeling and data science tools

- 1) To quantify system security and resilience, recovery rates or acclimation capacity for problems relevant to food, water and energy security, and human health.
- 2) To allow robust information transfer between temporal and spatial scales, and coupling of models of different scales for problems relevant to climate, food, water and energy security, and human health.

It is recommended that proposals exploit unique LANL resources:

- LANL high performance computing

- LANL experimental, and user facilities such as LANSCE, the High Magnetic Field Laboratory, the Geochemistry and Geomaterials Research Laboratory (GGRL), the omics and radiological chemistry capabilities

- DOE-sponsored models such as HiGrad/Firetec, Amanzi-Advance Terrestrial Simulator, CICE and E3SM.

- DOE-sponsored experimental datasets such as NGEE Arctic, NGEE Tropics and ARM

- Climate monitoring systems such as SUMO, LTER-network and CAFÉ.