Global Energy and Water Cycle Exchanges Project

Global Land-Atmosphere System Studies (GLASS) Panel

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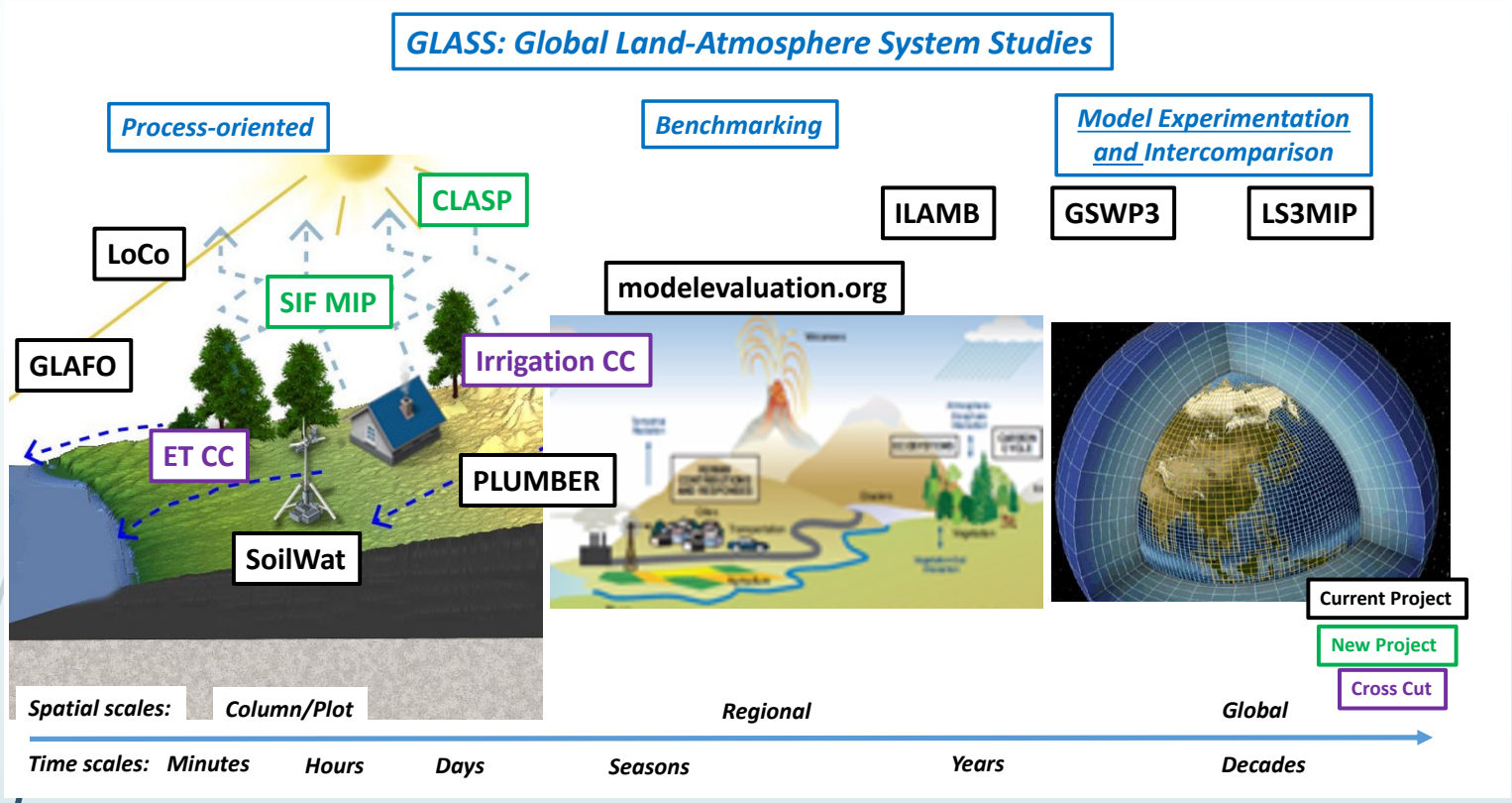
With materials from the GLASS Panel Project Leaders

Pan-GEWEX meeting
Friday 29 July, 2022, Monterey USA

Global / Land - Atmosphere System Studies

Ten GLASS Panel Projects: From column (process) to global scale



- **ILAMB**: International LAnd Model Benchmarking
- **Modelevaluation.org:** web application for evaluating and benchmarking computational models.
- **GSWP3**: Global Soil Wetness Project, phase 3
- **LS3MIP**: Land Surface, Snow and Soil Moisture MIP

- **LoCo**: Local Coupling Working Group
- **GLAFO**: GEWEX/GLASS Land-Atmosphere Feedback Observatories
- **SIFMIP**: Solar-Induced Fluorescence MIP
- **CLASP** (Coupling of Atmospheric Land and Sub-grid Parameterizations)
- **SoilWat**: Soils and Subsurface processes
- **PLUMBER2**: The Protocol for the Analysis of Land Surface Models (**PALS**) Land Surface Model Benchmarking Evaluation Project, phase 2

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GLASS: looking ahead

Synergies between projects/panels that allow us to address current **model limitations**, to improve our understanding and model **capability**

- **Model systems to take in multiple RS data**: Models process representation for data assimilation and with a focus on **observables**: SIF (SIF-MIP), VOD, optical spectra, brightness temperature, LST, etc. Links with GDAP
- **Representation of heterogeneity**: Can the models reproduce the observations at the km scale? And at the diurnal scale? We need to replace the Monin-Obukhov theory with more suitable theory to make progress. Links with GASS, ET CC
- **Ecosystem process representation**: 3-D connections between groundwater, soil water, roots, vegetation and atmosphere (water, heat and CO_2). Links with GHP, ET and irrigation CC
- **Surface water with an emphasis on lakes and reservoirs:** important for land surface heterogeneity, organisation of convection, links to ET and irrigation CC, RHPs, km-scale theme, NASA SWOT satellite launch

Potential emerging Activities

- **Groundwater/Ecohydrology:** focus on watershed scale, GRACE satellite, SIFMIP/SoilWat/CLASP/GLAFO/ILAMB (metrics), ET cross-cut, links with GDAP/GHP, regional scale stores and fluxes theme

- **'soil-cloud cascades'**: Collaboration between CLASP, SoilWat, (GLAFO) & GDAP, GASS, km-scale & mesoscale organisation of convection themes

- Connect with new **GABLS (**GEWEX Atmospheric Boundary-Layer Study)**:** strong links with GASS
  - Isolating components of the hydrological cycle (a period when vegetation is senescent; winter/spring period with saturated ground
  - Important to be aware of parallel/complementary initiatives like LIAISE

- Make best use of **existing observatories/observations** through joint project consolidation efforts: Southern Great Plains, GLAFOs, LIAISE, Tibetan plateau (ground-based and RS (GDAP))