Kelly Mahoney
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Hydrometeorological Modeling and Applications Team

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Physical Sciences Division

- Most relevant RHP research questions:
  1. Which characteristics of precipitation affect water availability, and how are they changing?
  2. What are the roles of land surface processes and human water use in affecting water availability?

- Most relevant RHP research foci:
  1. High–resolution coupled climate modeling
  2. Evaluation of Climate Projections & Assessments of Climate Impacts
  3. Mountain (Terrain) Hydrology
  4. Observations for process-level understanding and model evaluation and refinement

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- Which water-related limitation(s) in process-understanding, modeling, and monitoring in the Western U.S. and Canada require a large, 5-10 year integrated and interdisciplinary team approach?
  - Understanding, anticipating changes in precipitation and streamflow seasonalities and frequencies
- What do you see as the key objectives and tasks?
  - Long-term, high-resolution, coupled modeling
  - Better integration/exploitation of available observations to more efficiently, responsibly
- Which resultant social, economic, and/or environmental benefits justify the associated capital investment?
  - Water resources risk assessment – threats to life, property
  - Water availability, changing legal rights, water quality

U.S. Regional Hydroclimate Project (USRHP)

- Over-arching goal: How will fresh water availability change over the coming decade? How to best understand the impact of these changes on society?
- 4 main research questions:
  1. Which characteristics of precipitation affect water availability, and how are they changing?
  2. What are the roles of land surface processes and human water use in affecting water availability?
  3. How can new observational data *streams* be developed to detect and attribute changes in water availability, and constrain climate change projections? What new observations and observational strategies are needed?
  4. How predictable are the key drivers of water availability on subseasonal to decadal time scales in CONUS? What are the scales of useful predictability for different types of water availability and processes?

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  4. Observations for process-level understanding and model evaluation and refinement
  5. Ecosystem Science
  6. Water-Energy-People Nexus
  7. Socio Economic Aspects
  8. Policy Implications – governance and legislative issues, particularly on implementation and application of the science.

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- Research foci:
  1. High–resolution coupled climate modeling
     1. Mimi's CA WRF runs for the water year
     2. CO High res climate modeling to assess flood risk and hail
  2. Evaluation of Climate Projections & Assessments of Climate Impacts
     1. CO High res climate modeling to assess flood risk and hail , PGW runs
     2. SERDP-CORDEX Lower Miss Valley and CO Basin
     3. Mimi/Sarah Kapnick GFDL eval using PSD snow-level obs (maybe future downscaling as well)
  3. Mountain (Terrain) Hydrology
     1. Russian River obs and RDHM work
     2. Mimi's CA WRF runs for the water year
     3. Taylor Park WRF runs
     4. CO High res climate modeling to assess flood risk and hail
     5. Glacier NP moisture pathways and PGW work
  4. Observations for process-level understanding and model evaluation and refinement
     1. WRF-Hydro/probabilistic forecasts
     2. Russian River obs and RDHM work
     3. Mimi's CA WRF runs for the water year
     4. Taylor Park WRF runs
     5. CO High res climate modeling to assess flood risk and hail
     6. Front Range Flood sensitivity analysis
     7. SERDP-CORDEX Lower Miss Valley and CO Basin
     8. Glacier NP moisture pathways and PGW work