

SnowEx: a NASA airborne campaign leading to a snow satellite mission

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Partners/collaborators (partial list): US Naval Research Lab, JPL, National Snow and Ice Data Center, European Space Agency, MetaSensing, Environment Canada, Finnish Meteorological Institute

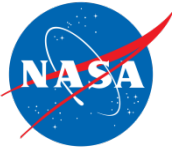
With contributions by many many others in the snow community

NASA Headquarters Program Manager: Jared Entin

Website: snow.nasa.gov → snowex

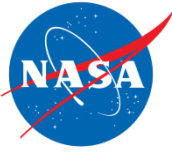
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What is SnowEx?



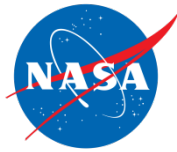
- A multi-year airborne snow campaign designed to collect multi-sensor aircraft data and ground truth measurements to enable algorithm development and inform the design of a future satellite mission
- **SnowEx is all about *challenging* the sensing techniques and algorithms....** to learn when, where and how each technique works alone, or in synergy with other techniques and models, where they do not work, and why

When is SnowEx?



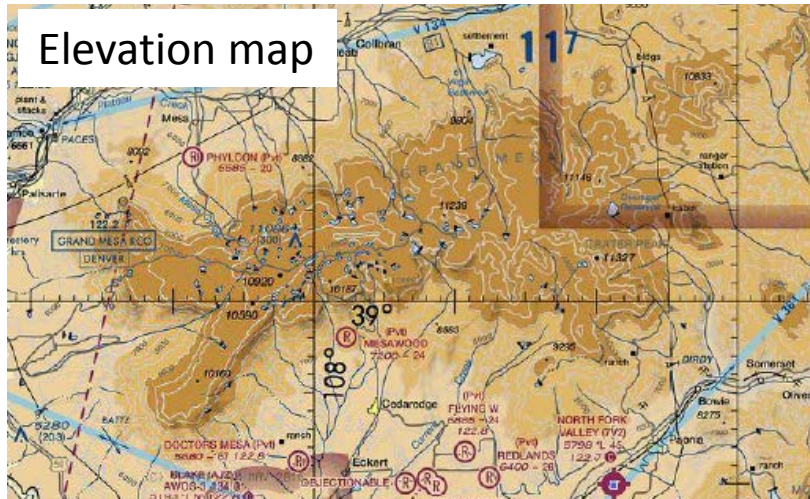
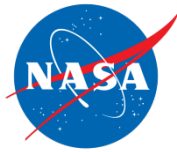
- Year 1 = 2016/17 dedicated campaigns
 - Year 2 = 2017/18 no campaign
 - Year 3 = 2018/19 dedicated campaigns
 - Year 4 = 2019/20 dedicated campaigns
 - Year 5 = 2020/21 dedicated campaigns
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- Year 1 focus: sensing snow in forests
 - Locations and foci for years 3,4,5 still to be decided
 - Overall goal: to characterize and advance our ability to sense different types of snow across various conditions/challenges to enable formulation of a strong snow satellite concept

Why SnowEx needs in-situ albedo measurements

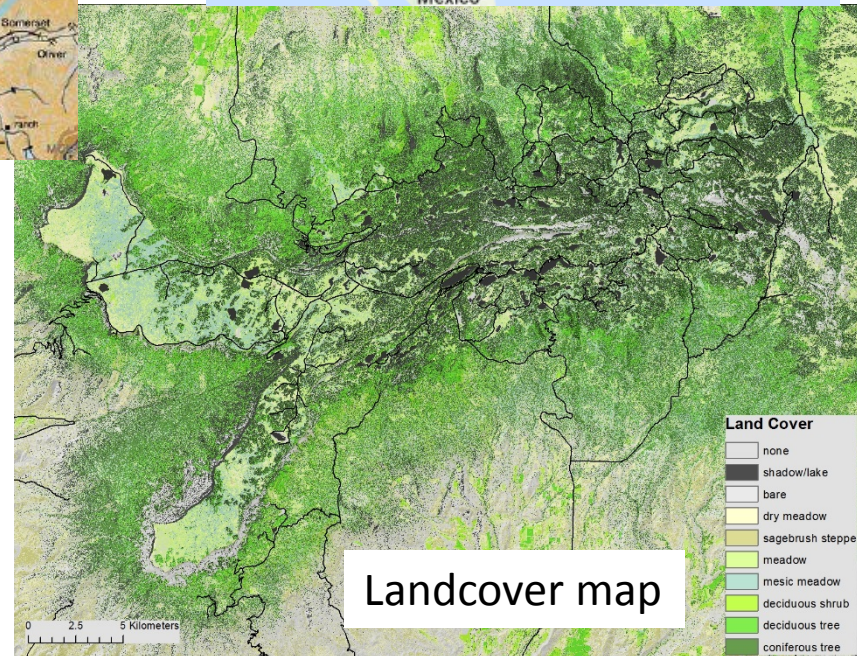


- Albedo is a major control on surface energy balance → controls the depletion of snowpacks
- SnowEx year 1 focus is on sensing snow in forests using various sensing techniques → BRDF & albedo are important to understand limitation mechanisms
- SnowEx will make airborne BRDF & hyperspectral measurements
- SnowEx needs ground-based albedo measurements to assist with interpretation of airborne observations
- Need albedo measurements and estimates over SnowEx domain to include in models
- The exact details are being decided right now—we need immediate input from albedo experts!

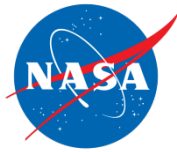
Grand Mesa site at a glance



- Primary SnowEx site
- Large flat-top mountain
- Elevation ~3000m
- East-west snow depth/SWE gradient
- Wide range of forest density (0-100%)
- Primarily conifer forest
- Survey teams will make in-situ obs over a wide area

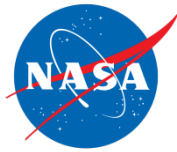


LSOS fixed site for in-situ measurements



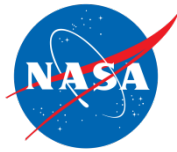
The fixed site (LSOS) is a campground with a variety of trees, heights, & densities. Continuous electrical power. Boom lift planned. Close to road, housing, food.

SnowEx summary



- Sites selected for 2016-17
 - Primary: Grand Mesa
 - Secondary: Senator Beck basin
 - Both western Colorado, USA
- Airborne sensors
 - Radar: SnowSAR (ESA)
 - Passive mw: AESMIR (GSFC)
 - BRDF: CAR (GSFC)
 - Lidar+ hyperspectral: ASO (JPL)
 - Thermal IR: TBD
- Likely aircraft
 - Sep/Oct 2016: ASO's aircraft
 - Feb 2017: NRL P-3 +ASO aircraft
 - Summer 2017: TBD
- Deployments
 - Sep/Oct 2016 lidar no-snow background; ASO-only flights; limited in-situ obs; 1 week
 - Feb 6—24, 2017: with-snow; all sensors fly; full in-situ obs; 3 weeks
 - Summer 2017: radar no-snow background; radar-only flights; limited in-situ obs
- Ground truth
 - Overall Lead: Kelly Elder
 - Grand Mesa site lead: Chris Hiemstra
 - Senator Beck site lead: HP Marshall
 - Multiple survey teams
 - Detailed planning in progress
- Ground Based Remote Sensing
 - Lead: Ludovic Brucker
 - 1 primary site + survey teams
 - Detailed planning in progress

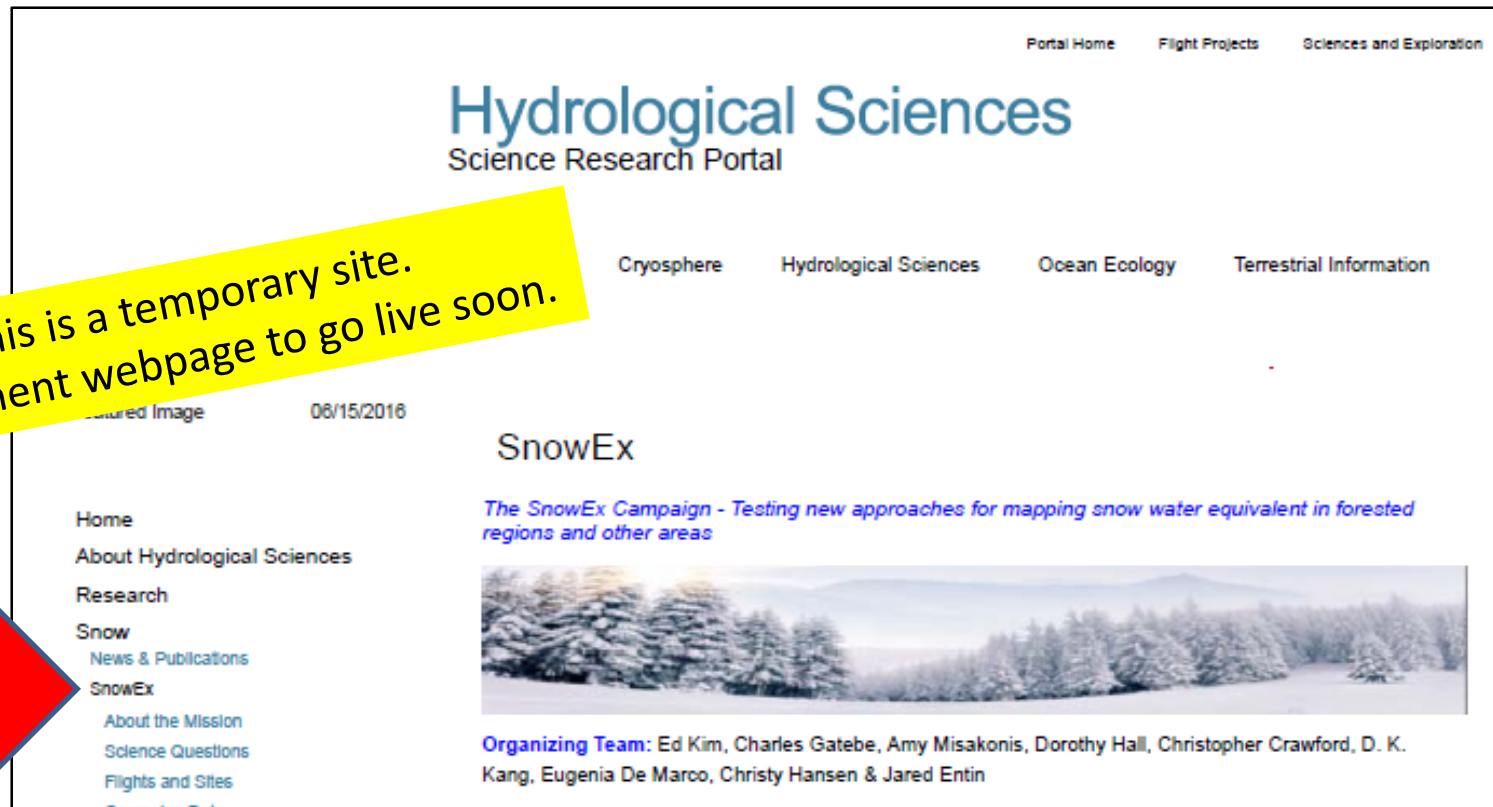
For more information



snow.nasa.gov → snowex

Note: this is a temporary site.
Permanent webpage to go live soon.

Click
here



Are you on the snowex email list?