Team Meeting 2020
The NASA BEF Team Meeting is scheduled for April 28 - 30 at the InterContinental DC, 801 Wharf St SW, Washington, DC 20024

The MBON Team Meeting on May 1. Current PIs, please register and check updates here.

The meeting will highlight advances in the use and application of biological remote sensing. This year’s meeting is held in tandem with the NASA Ocean Biology and Biogeochemistry (OBB) meeting. Coordinated activities with OBB are integrated into our schedule.

All funded PIs are asked to attend and present through the use of:
• Posters
  1st Year PIs & FINESST/NESSF
• 12-Minute Oral Presentations
  All Other PIs

By popular demand, the agenda will again include:
• Tutorials to highlight missions, data, platforms and tools funded by NASA ESD.
• A mentor lunch to pair early and late/mid-career professionals on Wednesday. Please contact Keith (keith.gaddis@nasa.gov) if you are interested in participating.

Funding Opportunities — NASA ROSES 2020
Research Opportunities in Space and Earth Sciences 2020
The 2020 NASA ROSES announcement (released Feb 14th) contains solicitations for both program elements:

A.16 Biodiversity
Seeks research proposals that combine Earth observations and in-situ data to explore patterns of biological diversity. This solicitation has two sub-elements:

1) Combining Space Station and In-Situ Observations for Biodiversity Understanding
   • Requests proposals combining observations from ECOSTRESS, GEDI, OCO-3, and/or DESIS.

2) Scale
   • Enhance operational or technological ability to integrate observations across spatial extents and grain sizes.
   • Increase theoretical knowledge of patterns and processes which underpin the biodiversity composition and change.

NOIs are due 4/24/20. Full proposals are due 5/22/20.

A.39 Ecological Forecasting
Seeks applications proposals that develop and demonstrate use of Earth observations for conservation. The goal is to transition applications to end users for their sustained use in decision-making. This solicitation has two sub-elements:

1) Protected Area (PA) Outcomes
   • Are PAs representative of Earth’s threatened biodiversity?
   • Are PAs effective at conserving natural systems?
   • Are PAs sufficiently connected?

2) Impacts of Rewilding for Ecosystem Restoration
   • Developing methods to understand, measure, and monitor the ecological progress of rewilding
   • Developing methods to determine, attribute, and monitor the costs and human benefits arising from rewilding.

NOIs are due 7/17/20. Full proposals are due 8/14/20.
Ending Data Sprawl One Newsletter at a Time
This recurring section highlights data/data portals to direct our community to emerging and less frequently used NASA products. This month we are featuring the flood of new spaceborne LIDAR data that enable detection of vegetation physical structure.

Global Ecosystem Dynamics Investigation
Since March of 2019, GEDI has gathered high-resolution full-waveform LIDAR data from ISS. Coverage: 51.6° N and 51.6° S Spatial and temporal resolution: 25m footprint, daily

• Level 1B Geolocated Waveform Data
  Geolocated, corrected, and smoothed waveform data without ground finding algorithm. Useful if you plan to apply your own algorithm to estimate derived ecological variables.

• Level 2A Elevation and Height Metrics Data
  Forest height data: Ground elevation, canopy top height, relative height metrics.

• Level 2B Canopy Cover and Vertical Profile Metrics Data
  Distribution of biomass within forest canopy data: Canopy Cover Fraction and profile, Leaf Area Index and profile. Access data through the Data Pool and NASA’s Earthdata Search.

Ice, Cloud, & land Elevation Satellite-2 Data
Since October of 2018, ICESat-2 has gathered LIDAR altimetry data in polar orbit. Coverage: Global Spatial and temporal resolution: 100m bin length, 91 day return

• L3A Land and Vegetation Height
  Forest height data: terrain height, canopy height, and canopy cover at fixed 100 meter intervals. Access data through OpenAltimetry and NASA’s Earthdata Search.

Applied Remote Sensing Training
Using the UN Biodiversity Lab
Mar 24, 31, and Apr 7, 2020 (French, English, and Spanish) Attendees will understand global initiatives (CBD, UNFCC, the 2030 Agenda) and the UN Biodiversity Lab structure, data, and tools.

Upcoming Conferences
International Association for Landscape Ecology
Toronto, Canada (5/10–5/14/20)
IUCN World Conservation Congress
Marseilles, France (6/11-6/19/20)
North America Congress for Conservation Biology
Denver, CO (7/26-7/31/20)
Ecological Society of America
Salt Lake City, UT (8/2–8/7/20)

New Ecological Datasets
Recently published ecologically-relevant remote sensing datasets:

Daily SIF Estimates

Aboveground Biomass, NW USA

Alaskan Climate Normals
AK Climate Normals for Last Glacial Maximum and Modern (1975-2005).

California Harmful Algae Risk Map
Comparing C-HARMS model using CA-ROMS or WCOFS and MODIS or VIIRS.

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Climate Change Chills Sub-Snow Species in Winter

The authors examined the impact that changing global climate has on species who depend on snow cover to avoid extreme winter temperatures by burrowing between the snowpack and ground. These authors measured land surface freeze/thaw status and snow cover using NASA and JAXA products and forecast future trends under a scenario of increasing greenhouse gas emissions (RCP 8.5).

- Since the 1980s, average snow-covered days decreased by 18 day, and the average length of frozen ground without snow increased 1-5 days.
- By 2100, snow covered days will decrease an additional 16 days and frozen ground without snow cover will increase by 5 days.

Mid-latitudes are most affected, with warming climate causing functionally colder winters for species dependent on sub-snow environments to survive low temperatures. [Zhu et al (2019) Nat Clim]

Incorporating Nature’s Value in Decision Making

Two recent publications highlight the policy and methodological advances in natural capital accounting.

The first documents the past history and current needs of Experimental Ecosystem Accounting, which incorporates environmental inputs into national records of economic activity. [Hein et al (2020) Science]

- Ecosystem accounts have been compiled for 24 countries.
- Remaining technological limitations to implementation are outlined.

The second article describes a methodology for sustainable adoption of ecosystem accounting using Google Earth Engine.

- The authors generated land cover maps for Liberia and Gabon using a random forest pixel-based classification system which improves the accuracy of prior products for this region.
- This relatively simple and highly replicable approach will support the implementation of international agreements to incorporate the value of nature into national decision making [Sousa et al (2020) PloS one].


Recurrent Sargassum belts have been observed in satellite imagery since 2011, often extending from Africa to the Gulf of Mexico.

- In June 2018, the 8850-kilometer wide Great Atlantic Sargassum Belt contained >20 million metric tons of Sargassum biomass.
- Recent increases and interannual variability appear to be driven by upwelling off West Africa and Amazon River discharge.

These results indicate a possible regime shift, raising the concern that recurrent blooms in the Atlantic and Caribbean Sea may be the norm.
Dr. Mary Blair is a conservation biologist who integrates spatial modeling and molecular genetics to understand the evolutionary processes that generate biodiversity and the influence of environmental variability on evolutionary divergence. Her NASA funded work is expanding the open-source species distribution modeling software Wallace to facilitate biodiversity change indicator calculations for national biodiversity assessments and reporting with satellite derived products. This work is conducted in partnership with the Colombia BON to enhance their existing BON in a BOX tool, BioModelos. Products from BioModelos have formed the basis for conservation decision support products including national risk assessments, reintroduction plans, regional land-use planning and biodiversity compensation manuals. Improvement in these tools will lower the entry barriers to generating EBVs and level the playing field for who can create high-quality products. Dr. Blair is the Director of Biodiversity Informatics Research at the Center for Biodiversity and Conservation within the AMNH and an Affiliated Professor at the Richard Gilder Graduate School and Columbia University's Dept. of Ecology, Evolution and Environmental Biology.

Dr. Tony Chang examines long and short term response of plant populations to changing global climate using rapidly developing artificial intelligence technologies. A former NESSF awardee, his graduate work leveraged machine learning methods to forecast suitable habitat change for "early responder" tree species in the Northern Rockies under alternative climate change scenarios. Currently, he is using modern software development capability (containerized environments, version-control, continuous integration/deployment, and cloud-computing) to develop data downloading, preprocessing, and analytic capacity within an open-access toolkit for near real time forecasting of global phenological patterns (Advanced Phenological Information System). Dr. Chang's work is leading the field of automated machine learning to process high resolution Earth observation data. His model, a multi-task recurrent convolutional neural network (Chimera), integrates varying resolution aerial and satellite imagery to simultaneously classify forest cover and estimate forest structure metrics. This work enables automated detection of forest degradation due to insects, disease, land use, and fire in threatened environments.

Recent Publications From The Program


Recent Publications From The Program (Continued)


Recent Publications From The Program (Continued)


McGeoch, M., and Jetz, w.. "Measure and Reduce the Harm Caused by Biological Invasions." One Earth 1, no. 2 (2019): 171-174.


Recent Publications From The Program (Continued)


