# **NEON's Higher Level Science Products from Airborne Hyperspectral Data:** Processing Approach for Current Products and Procedure for Proposing New Products

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#### Abstract

The National Ecological Observatory Network (NEON) is a continentalscale ecological observation platform designed to collect and disseminate data products to enable understanding and forecasting of the impacts of climate change, land use change, and invasive species on ecology. Data products derived from NEON's Airborne Spectrometer are presented, along with the processing approach to calibrate the data and perform geometric and atmospheric corrections (L0 – L1B processing). Individual swaths collected by the spectrometer will be mosaicked and products provided at native resolution (L2) and regridded/remapped into the NEON 10m-grid (L3); these products represent a subset of NEON's Bioclimate and Biogeochemistry data products. In addition, communityproposed new, operational data product submissions to the NEON data processing stream is presented.

### Airborne Data Products

NEON Airborne remote sensing will produce over 40 data products ranging from at-sensor radiance to biomass estimates that use data from the imaging spectrometer, waveform lidar and through fusion of the two instrument streams (Level 4 Products).



NEON Level 2 Data Products

Formal Call released to Community for New Product Proposals

## **Proposed: NEON New Product Process**

The proposed flow of activities from conception of a new high level data product from external community members to its acceptance by the observatory involves a number of steps. This proposed process is designed to conform to the NEON System Integration, Verification and Validation (IV&V) plan.



**Operational Data Product Stream** 



Examples of Level 4 Data Products **Proposal Submission are** reviewed on a regular

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## Airborne Observatory Platform (AOP) Spectrometer: Baseline LO – L3 Processing Flow

NEON data product processing levels are consistent with national standards. The NEON levels parallel levels developed by the National Research Council Committee on Data Management, Archiving, and Computing (CODMAC, 1982), and recently reinterpreted by the NASA PDS Data Management Council (2010), including Raw, Calibrated, and Derived categories.



initially approved for release as L1A





L0-L1G processing focuses on calibration, geolocation, atmospheric correction and orthorectification. ATCOR is currently baselined for the atmospheric correction and a custom geolocation model has been developed specifically for the NEON data.

#### L1G – L3 processing focuses on production of Biogeophysical Variables both at native resolution (~1m) and resampled/regridded to 10m spatial resolution and projected onto a common NEON grid. Algorithm selection for Level 2 products is ongoing; baseline approaches will build on published algorithms, while the goal is to developed an integrated radiative transer approach, using the hyperspectral data fused with concurrently collected lidar data, digital camera data and other ancillary data sources.

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