ESS-DIVE Offline Metadata Template
For Data Package Web Form Submissions

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To prepare your data package metadata for submission to ESS-DIVE, please download and complete this template. We recommend collaborating with your team members in Google Docs prior to creating your data package on ESS-DIVE.

: These fields are required in order to draft and save your data package privately on ESS-DIVE. These fields are marked with a red star on the ESS-DIVE web form.

: While these metadata fields are not initially required, they must be completed in order for your data package to pass the metadata quality review process and be published. Your data package will not be published on ESS-DIVE's public listing or given a DOI without passing our quality review.

Please view our Package-Level Metadata Guide (https://docs.ess-dive.lbl.gov/data-and-metadata-upload/package-level-metadata) to view detailed requirements for each field, we recommend using these two resources in parallel. When ready, use the Web Submission Form or our Package Service API to submit your data package to ESS-DIVE. For more information about your submission options, visit our Data and Metadata Upload documentation (https://docs.ess-dive.lbl.gov/data-and-metadata-upload).

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Web Form Metadata Fields	**Data Package Metadata**
OVERVIEW	
Data Package Title *A brief title between 7-20 words long which contains relevant information such as the topic, geographic location, dates, and scale of data.*	*Fuel and consumption grids from 2017 and 2018 burn experiments at Fort Jackson, South Carolina* *Example: Raw sapflow and soil moisture data from Jan 2016-Apr 2016 in Manaus, Brazil*
Existing DOI(s) and Alternate Identifier(s) *If this data package has been previously published elsewhere, enter the DOI or alternate identifier. Identifiers are used to locate the dataset within your project's data management system and can provide pertinent contextual information for*	*NA* *Example: http://dx.doi.org/10.15486/NGT/XXXXXX*

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users. Enter as many identifiers as needed.	
Abstract *The abstract should be at least 100 words in length, written in full sentences, and understandable to anyone who has not seen related manuscripts. Include a statement about the purpose for why these data were generated and the research question it is intended to answer. A good abstract would provide users with adequate information to determine if the data are useful for their needs*	*This data package contains gridded estimates of pre- and post-fire fuels and fuel consumption derived from field-observed 3D shrub plot data (REF TO 3D SHRUB PLOT PROD) and terrestrial laser scanner (TLS) point clouds. Data were collected at Fort Jackson, Columbia, South Carolina in May 2017 and 2018 as part of prescribed burn experiments for the Department of Defense Strategic Environmental Research and Development Program (SERDP), Project RC-2640: "Fundamental measurements and modeling of prescribed fire behavior in the naturally heterogeneous fuel beds of southern pine forests."* *The file 'prefire_fuel_grids.zip' contains nine zipped GeoTIFFs of pre-fire fuel estimates; the file 'postfire_fuel_grids.zip' contains nine zipped GeoTIFFs of post-fire fuel estimates; and the file 'consumption_grids.zip' contains nine zipped GeoTIFFs of estimated consumption. Grids are named and correspond to their respective burn units and years, are in units of grams per meter cubed, have a spatial resolution of 1 meter, and are projected in Universal Transverse Mercator (UTM) Zone 17 North, WGS 84 coordinates. Three additional burn units that were not in the analysis of the six burn units presented in Hudak et al. 2020 (Figure 1) are included here; these burn units are '16D6-18' adjacent to '16D5-18'; '24A7T-18', adjacent to '24A7-18'; and '24B8T-18', adjacent to unit '24B8-18'.* *Example: This data package contains raw output from a data logger connected to 9 sapflow and 5 soil moisture sensors in Manaus, Brazil. The file xxx.dat contains raw data and the metadata file (BR-Ma2_E-fieldlog_20160501.xls) has information on locations where the sensors were installed and other sensor maintenance details. No data processing or QA/QC was done on the raw data packages. Processed data will be uploaded as separate data packages on ESS-DIVE. This research was performed as a part of the NGEE Tropics project, which aims to advance model predictions of tropical forest carbon cycle responses to a changing climate over the 21st Century.*
Keyword(s)	*Earth Science > Biosphere > Vegetation > Forest Composition/Vegetation Structure* *Earth Science > Biosphere > Vegetation > Biomass* *Earth Science > Biosphere > Ecological Dynamics > Fire Ecology > Fire Disturbance*

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Add a minimum of three total keywords or data variables, choose from the list of GCMD controlled vocabulary where possible. Ensure that these terms differ from words in the title to increase the findability of your dataset in searches.	*Earth Science > Biosphere > Ecosystems > Terrestrial Ecosystems > Forests > Temperate Mixed Forest* *Continent > North America > United States of America > South Carolina* *Example: Earth Science > Biosphere > Vegetation > Biomass*
Data Variable(s) *Measurement variables present in the data package. Add a minimum of three total keywords or data variables, choose from the list of GCMD controlled vocabulary and CF variables where possible.*	*Earth Science > Biosphere > Vegetation > Biomass* *Earth Science > Biosphere > Ecological Dynamics > Fire Ecology > Fire Models* *Example: Earth Science > Land Science > Soils > Soil Moisture/Soil Water Content*
Publication Date *Specify a custom date or year when this data package can be made publicly available. If this*	*YYYY-MM-DD or YYYY*

is not specified, it will default to the current date. The value should either be a four digit year (YYYY) or a full date in the ISO format (YYYY-MM-DD).	
Usage Rights *Choose how you wish your data to be shared and reused. Usage rights for the metadata will always be Creative Commons Public Domain. Pick from one of the options.*	Creative Commons Public Domain *Choose* Creative Commons Attribution *or* Creative Commons Public Domain
Project Affiliation *Enter the name of the DOE project to associate with this data package. The project is cited as the publisher of this dataset. If multiple projects were involved, enter the project that had the largest*	*Department of Defense Strategic Environmental Research and Development Program (SERDP), Project RC-2640: "Fundamental measurements and modeling of prescribed fire behavior in the naturally heterogeneous fuel beds of southern pine forests." [PI: David Weise]* *Example: Next-Generation Ecosystems Experiments (NGEE) Tropics [PI: Jeffery Chambers]*

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contribution to this data package. *Search from [the project list]() or write in your own.*	
Funding Organizations *List the organizations that funded the work. Search from [the project list]() or write in your own.*	*US.DOD > Strategic Environmental Research and Development Program (SERDP)* *Example: US.DOE. > Office of Science > Biological and Environmental Research (BER)*
DOE Contract Number *If applicable, list the numbers of any DOE contract under which the data in the package was funded. If the data were a result of a joint effort between two or more DOE Site/Facility Management Contractors, etc., additional DOE contract numbers may be entered. Search for a DOE*	*RC-2640* *Example: AC0205CH11231*

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Contract from [the project list](#) or write in your own.	
Related Reference(s) *Include the full citations and DOIs of data packages or publications associated with your data package, where users can learn more about the dataset, processing method, or how the data were used.*	*Andrew T Hudak, Akira Kato, Benjamin C Bright, E Louise Loudermilk, Christie Hawley, Joseph C Restaino, Roger D Ottmar, Gabriel A Prata, Carlos Cabo, Susan J Prichard, Eric M Rowell, David R Weise. 2020. Towards Spatially Explicit Quantification of Pre- and Postfire Fuels and Fuel Consumption from Traditional and Point Cloud Measurements, Forest Science, Volume 66, Issue 4, Pages 428–442, https://doi.org/10.1093/forsci/fxz085.* *Example: Somebody J. (2018), Sapflow and soil moisture coupling in the Amazon, Journal. doi: xx.xxxx*
PEOPLE	
Contact *Person who should be listed as the contact for the data package for the purposes of the DOI or for users seeking further information for the data. Only one contact is allowed per data package. If none are entered, you will be set*	*Andrew T. Hudak, andrew.hudak@usda.gov, USDA Forest Service, 0000-0001-7480-1458* *Name, email, affiliation, ORCID*

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as the contact for this document.	
Creator(s) *The main researchers involved in producing the data. These include authors, owners, originators and principal investigators who should be listed in the citation. At least one creator is required. If none are entered, you will be set as the creator of this document. List creators in the order they need to appear in the citation. More entries will appear as you enter information.*	*Andrew T. Hudak, andrew.hudak@usda.gov, USDA Forest Service, 0000-0001-7480-1458* *Akira Kato, akiran@faculty.chiba-u.jp, Chiba University, Japan, 0000-0002-4957-1707* *Benjamin C. Bright, benjamin.c.bright@usda.gov, USDA Forest Service, 0000-0002-8363-0803* *Christie Stegall Hawley, christie.m.hawley@usda.gov, USDA Forest Service, 0000-0001-9105-2065* *E. Louise Loudermilk, eva.l.loudermilk@usda.gov, USDA Forest Service, 0000-0001-8191-8670* *Gabriel A. Prata, EMAIL, University of Florida, 0000-0003-1689-4881* *David Weise, david.weise@usda.gov, USDA Forest Service, 0000-0002-9671-7203* *Name, email, affiliation, ORCID*
Contributor(s) *Additional contributors involved in producing the data. These could include people who assisted in creating the data*	*Name, email, affiliation, ORCID*

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package but wouldn't be considered authors for publication. Enter as many contributors as needed.	
DATES	
Start Date *Earliest date of data collection included in the data package. Provide in ISO format (YYYY-MM-DD)*	*2017-05-05*
End Date *Last date of data collection included in the data package. Provide in ISO format (YYYY-MM-DD). Leave blank if your data set is open-ended.*	*2018-05-03*
LOCATIONS	

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Geographic Description(s) *A short description of the location(s) where data was collected. This may include the location name, known identifiers if associated with a specific project (e.g. Ameriflux site name), and ecosystem type involved. Multiple geographic descriptions can be added if necessary.*	*Experimental burn units 16D1, 16D2, 16D5, 16D6, 24A, 24AT, 24B, and 24BT at Fort Jackson, a United States Army installation that the U.S. Army Training and Doctrine Command (TRADOC) operates on for Basic Combat Training (BCT). Fort Jackson is located within the city of Columbia, South Carolina. The burn units are contained within larger management units 16D, 24A and 24B at Ft. Jackson.* *Example: Br-Ma2, Manaus, Brazil: ZF2 K34 Tower. Eddy covariance site established in 1999 on kilometer 34 of the ZF2 highway. It was later expanded into an atmospheric and soil sampling hub. It is a 1.5m x 2.5 m- section aluminum tower, 50 m tall, on a medium sized plateau (Araujo et al., 2002).*
Geographic Location Coordinates *Latitude and Longitude of the location(s) this data represents in WGS84 decimal format. Enter only one coordinate pair for a single point and bounding box coordinates for non-point locations. If the data is better represented by a shape,*	*34.09934, -80.78496* *Northwest Coordinates: Lat, Long*
	34.04710, -80.77624 *Southeast Coordinates: Lat, Long*

include a KML file in the file uploads.	

METHODS

Method(s) *Methods for a dataset should focus on all aspects of dataset production and should be thorough enough for your work to be reproduced. Include descriptions of the experimental design, laboratory and/or field collection methods, source data for synthesis studies, data processing and QA/QC procedures, and known issues or limitations of data where applicable. You can also provide a citation for any methods used that were published previously.*	*Step 1:* *Study areas were selected by Fort Jackson managers and SERDP-funded scientists for scientific investigation and prescribed burning experiments in 2017 and 2018. Selected areas had been burned two years previous and had a relative abundance of Sparkleberry (Vaccinium arboretum Marshall) shrub cover in mixed Pinus palustris and Pinus elliottii stands.* *In 2018 aboveground shrub biomass (live and dead) was sampled within 4 experimental prescribed burn units: 16D1-18, 16D5-18, 24A7-18, and 24B8-18. The paired pre-fire and postfire plot locations were subjectively selected such that the sparkleberry shrub clumps within each pre- and post-fire plot pair were of similar size and structure. At each of the experimental burn units, there were 4 pre and 4 post burn 3D clip plots. These clip plots used the 3D sampling frame and stratum process (Hawley et al. 2018), however, occupied voxel data were not collected. The plots were clipped from the top of the vegetation down to 10 cm above mineral soil in 10-cm increments.* *Metal conduit with reflective tape marked the center of the plot and the 3D sampling frame was placed so the conduit was in the center of the clip plot. Clip plots were 0.5 x 0.5 m in area and extended from ground level to 2 m above ground level. Plots were oriented so that plot edges ran parallel and perpendicular to the four cardinal directions. Differentially-corrected GNSS locations were adjusted by locating the conduits in the TLS point clouds and adjusting locations accordingly. Christie Hawley and Louise Loudermilk were assisted by Kendra Sultzer and Kelsey Smith, contractors with Whitetail Environmental working at Fort Jackson for gathering clip plot data.* *TLS measurements across each burn unit, which were roughly 40x40 m in size, were taken before and after prescribed burns in both 2017 and 2018. For details on TLS measurements, see Hudak et al. (2020). Briefly here, an LMS 511 TLS scanner was used to take scans at various locations within burn units. TLS scans resulted in 3D point cloud data*

consisting of X,Y,Z locations. Point cloud data were georegistered to real-world coordinates by pairing treetops visible in the TLS point clouds with the same treetops visible in coincident georeferenced airborne laser scanner (ALS) data.

TLS point cloud data from various scans were merged and voxelized. Voxels coincident with clip plot locations were related to clip plot biomass data to develop models predicting fuels from point-cloud voxels. Models were applied to pre- and post-fire voxelized point clouds to estimate pre- and post-fire fuels and produce these grids. Pre- and post-fire fuel grids were differenced to create fuel consumption grids. Only the 2018 field observations that met our QA/QC standards were included in model development as detailed in Hudak et al. (2020). However, we applied models to both 2017 and 2018 TLS data to create these gridded products. For modeling details, see Hudak et al. (2020).

Hawley, Christie M.; Loudermilk, E. Louise; Rowell, Eric M.; Pokswinski, Scott. 2018. A novel approach to fuel biomass sampling for 3D fuel characterization. MethodsX. 5: 1597-1604. https://doi.org/10.1016/j.mex.2018.11.006.

Andrew T Hudak, Akira Kato, Benjamin C Bright, E Louise Loudermilk, Christie Hawley, Joseph C Restaino, Roger D Ottmar, Gabriel A Prata, Carlos Cabo, Susan J Prichard, Eric M Rowell, David R Weise. 2020. Towards Spatially Explicit Quantification of Pre- and Postfire Fuels and Fuel Consumption from Traditional and Point Cloud Measurements, Forest Science, Volume 66, Issue 4, Pages 428–442, https://doi.org/10.1093/forsci/fxz085.

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	Step 2: (Continue adding steps as needed)