

Environmental System Science - Data Infrastructure for a Virtual Ecosystem

Deb Agarwal, Charuleka Varadharajan,
Shreyas Cholia, **Cory Snaveley**, Valerie Hendrix,
Fianna O'Brien, Abdelrahman Elbashandy,
Yeongshnn Ong, **William Riley**, Chris Jones, Matt
Jones, and Karen Whitenack



ESS-DIVE

Deep Insight for Earth Science Data

<http://ess-dive.lbl.gov>



ESS-DIVE is live!

LAUNCHED APR 1, 2018

data.ess-dive.lbl.gov

data-sandbox.ess-dive.lbl.gov



The ESS-DIVE Team



**Data Scientists and
Software engineers**



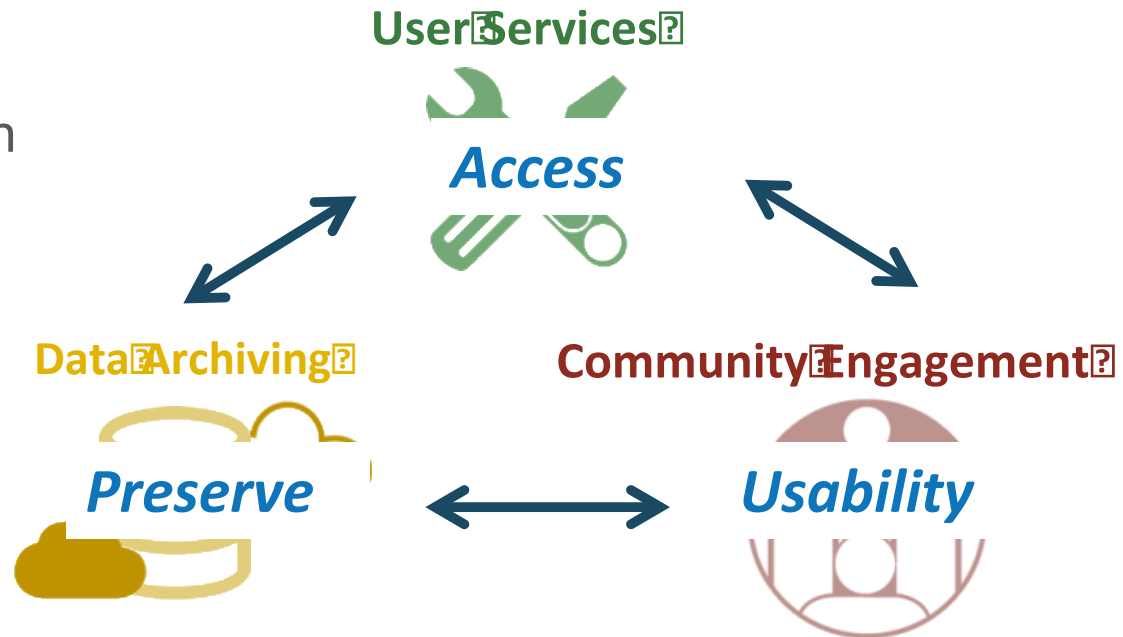
Digital Librarians



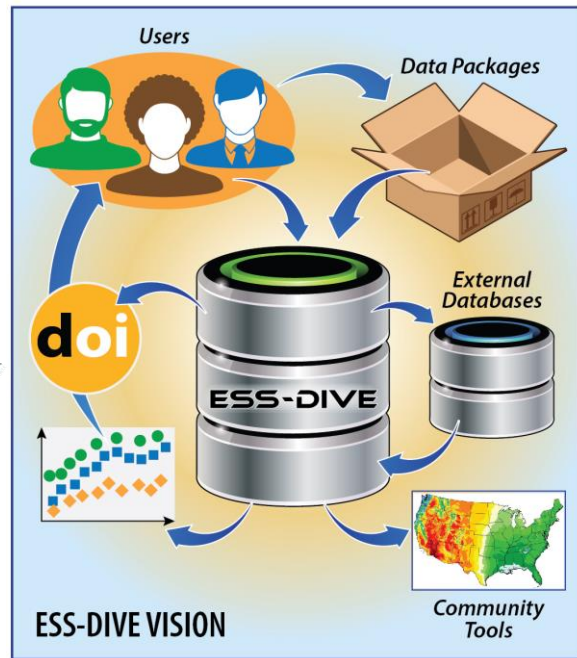
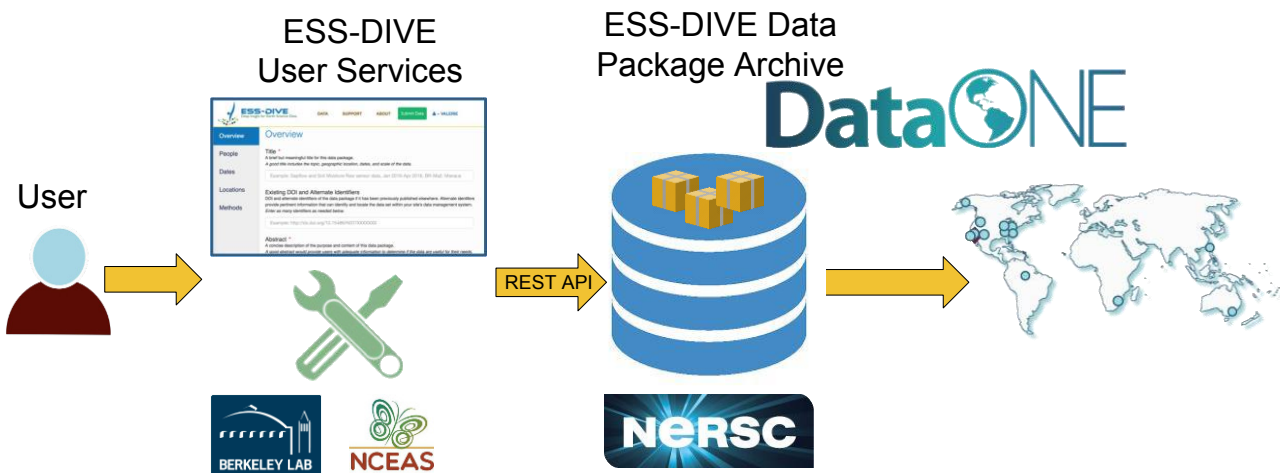
**Environmental
Scientists**

ESS-DIVE Mission and Approach

To **preserve**, expand **access** to, and improve **usability** of critical **data** generated through DOE-sponsored research of **terrestrial and subsurface ecosystems** in support of the DOE's efforts to address some of society's most pressing energy and environmental challenges.



2018: A Data Archive that Stores and Provides Easy Access to ESS Data



Creating a Data Package



ESS-DIVE Data Archive initially supports most common use cases.

- ✂ **Upload** data and metadata bundled together as a **data package**
- ✂ Release data packages publicly with a digital object identifier (**DOI**)
- ✂ Package metadata includes **brief description of data**: title, abstract, authors, keywords, project etc.
- ✂ Data usage licensing **CCby4** and **CC0**

ESS-DIVE
Deep Insight for Earth Science Data

DATA SUPPORT ABOUT Submit Data DEBORAH

Untitled dataset. null. ess-dive-1d96557676fa48d-20180429T132138224.

To submit a new data package or make major revisions to an existing data package

1. Add files
2. Enter the required * fields in the sections below
3. Hit the submit button, which appears after the first metadata entry

Files	Size	Type	Status
▼ Untitled dataset			+ Add Files

Add files to start your dataset

+ Add Files

Overview *

People

Dates

Locations

Methods

Title *

A brief but meaningful title for this data package.
A good title includes the topic, geographic location, dates, and scale of the data.

Example: Sapflow and Soil Moisture Raw sensor data, Jan 2016-Apr 2016, BR-Ma2: Manaus

Existing DOI and Alternate Identifiers

DOI and alternate identifiers of the data package if it has been previously published elsewhere. Alternate identifiers provide pertinent information that can identify and locate the data set within your site's data management system.
Enter as many identifiers as needed below.

Example: <http://dx.doi.org/10.15486/NGT/XXXXXX>

Abstract *

A concise description of the purpose and content of this data package.
A good abstract would provide users with adequate information to determine if the data are useful for their needs.

Example: Raw output from the data logger connected to 9 sapflow and 5 soil moisture sensors are provided in xxx.dat. The

ESS-DIVE Initial Search Interface



ESS-DIVE Data Archive initially supports most common use cases.

- Multiple ways to **find data** through keyword search and filters
- Public download** of data and metadata
- Tracking of downloads** for data contributors
- ORCID logins** provide federated access

ESS-DIVE Deep Insight for Earth Science Data

DATA SUPPORT ABOUT Submit Data Sign in with Orcid

Search Search phrase

Filter by:

- Identifier
- Location
- Creator
- Year

DATASETS 1 TO 7 OF 7

Sort by Most recent

Angell J; Korshover K; Planet W (1991): **Annual and Seasonal Global Variation in Total Ozone and Layer-Mean Ozone, 1958-1987 (1991)**. Carbon Dioxide Information Analysis Center (CDIAC), Oak Ridge National Laboratory (ORNL), Oak Ridge, TN (United States). doi:10.3334/CDIAC/ATG.NDP023

Sterin A (2001): **Tropospheric and Lower Stratospheric Temperature Anomalies Based on Global Radiosonde Network Data (1958 - 2005)**. Carbon Dioxide Information Analysis Center (CDIAC), Oak Ridge National Laboratory (ORNL), Oak Ridge, TN (United States). doi:10.3334/CDIAC/CLI.004

Lamb H (1985): **Volcanic Loading: The Dust Veil Index (1985) (NDP-013)**. Carbon Dioxide Information Analysis Center (CDIAC), Oak Ridge National Laboratory (ORNL), Oak Ridge, TN (United States). doi:10.3334/CDIAC/ATG.NDP013

Andres R; Boden T; Marland G (2009): **Annual Fossil-Fuel CO2 Emissions: Isomass of Emissions Gridded by One Degree Latitude by One Degree Longitude**. Carbon Dioxide Information Analysis Center (CDIAC), Oak Ridge National Laboratory (ORNL), Oak Ridge, TN (United States). doi:10.3334/CDIAC/ATG.NDP013

Hide Map

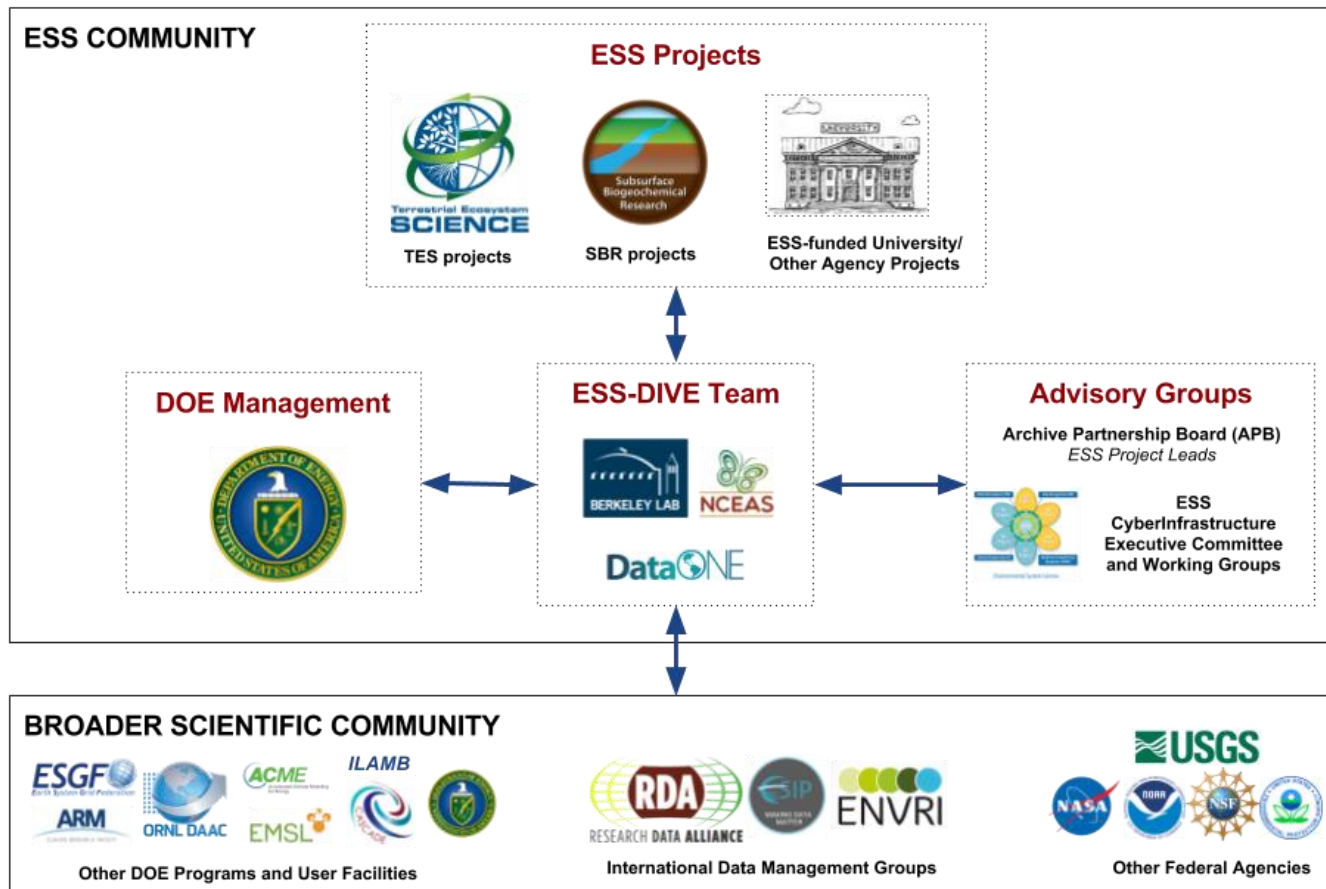
Map data ©2018 1000 km Terms of Use

Google

Satellite Terrain

ORNL NERSC NCEAS U.S. DEPARTMENT OF ENERGY Office of Science

ESS-DIVE is a Partnership with the ESS Community



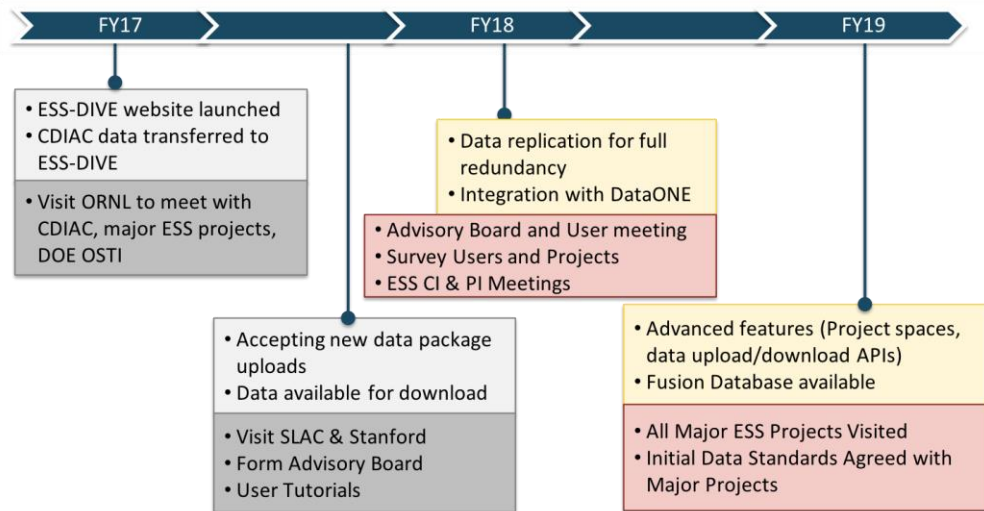
Project Accomplishments Timeline

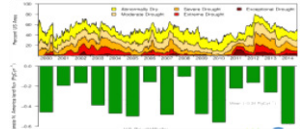
Implementation

- ✧ 2017 July – Project start
- ✧ 2017 Sept. – Old archive transferred
- ✧ 2018 April – ESS-DIVE live

Community engagement

- ✧ 2017 May – ESS CI and PI Mtg
- ✧ 2017 July - Visit to ORNL and OSTI
- ✧ 2017 Dec – Visit to Stanford/SLAC
- ✧ 2018 March – Advisory Board Mtg
- ✧ 2018 May – ESS PI Mtg

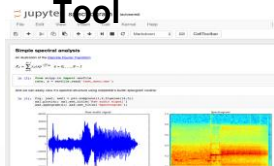




C flux Tool



Groundwater Constituent



Spectral Processing Jupyter Notebook

Enhancing Value of Public Archive to ESS Community



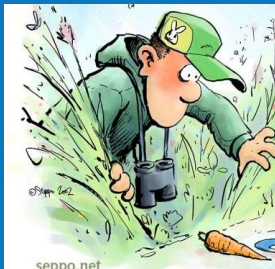
- **Publish** data with **DOIs** for citation and identifying provenance
- Understand **user needs** with User Experience Research
- Adopting **community standards** for data and metadata
- Provide archiving of **private/project** data packages to support cradle-to-grave data archiving
- Build **fusion database** to enable integrated data search, download, and visualization
- Enable new data tools and capabilities through **community development**

What can ESS-DIVE do for ESS researchers now?



DATA CONTRIBUTORS:

ARCHIVE and PUBLISH diverse data in many formats. OBTAIN DOIs to cite and track data usage.



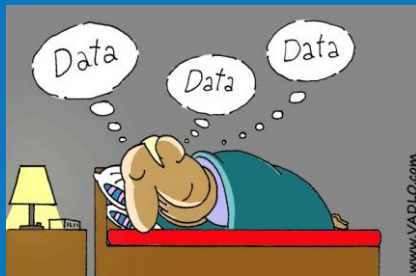
DATA USERS:

FIND AND OBTAIN ESS data that is organized for easier use.



PROJECT PIs:

MANAGE your project data and metadata. Get LETTERS OF SUPPORT for your proposal.



A SUPPORTED COMMUNITY:

FOSTER collaboration by listening to your needs!





Questions

[Contact us - ess-dive-support@lbl.gov](mailto:ess-dive-support@lbl.gov)

[Project web site - http://ess-dive.lbl.gov](http://ess-dive.lbl.gov)

Meet our team at the PI meeting!