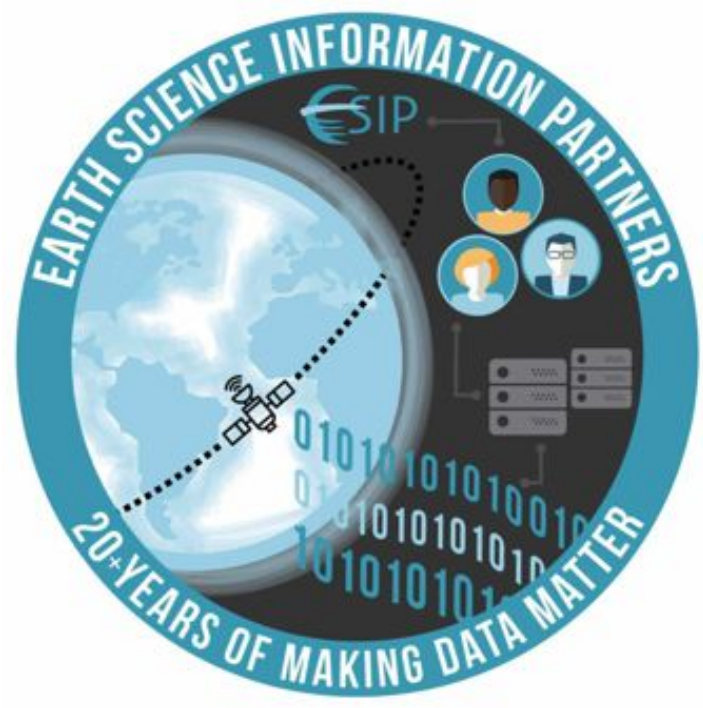
ESIP Collaboration Area Highlights Webinar

Data in Action: Increasing the Use and Value of Earth Science Data and Information

April 19th, 2019 | Webinar #2

Introduction



Megan Carter,
Community Director
Earth Science Information Partners (ESIP)
megancarter@esipfed.org

Data to Action: Increasing the Use and Value of Earth Science Data and Information

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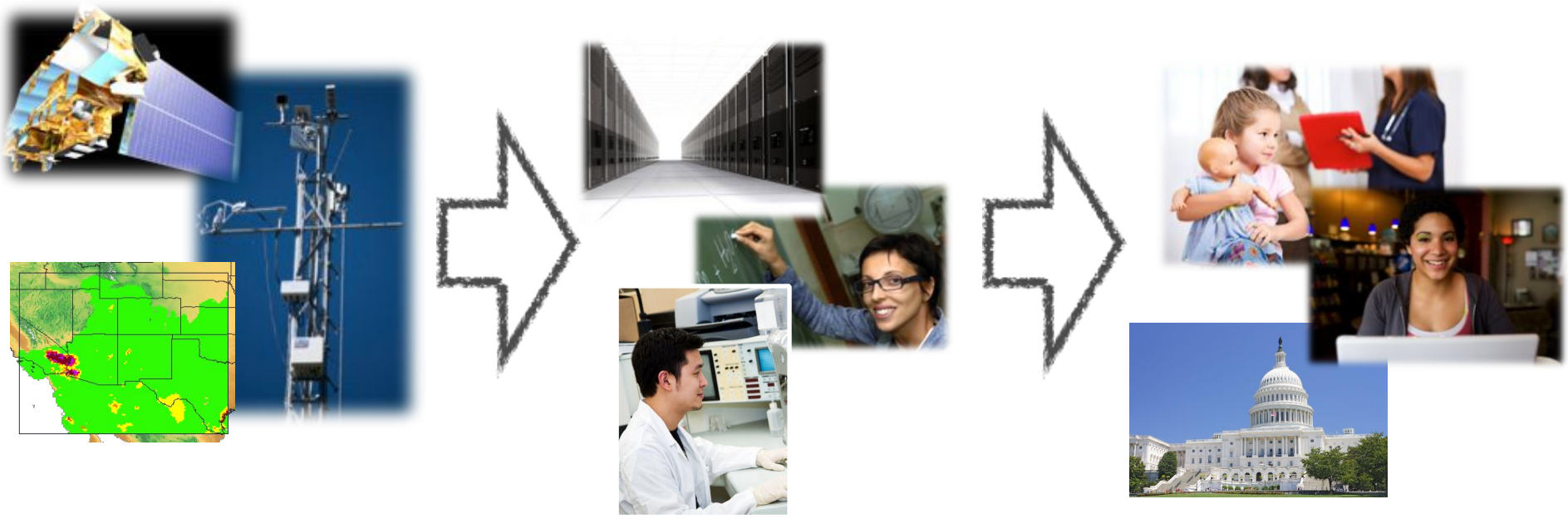
ESIP Vision

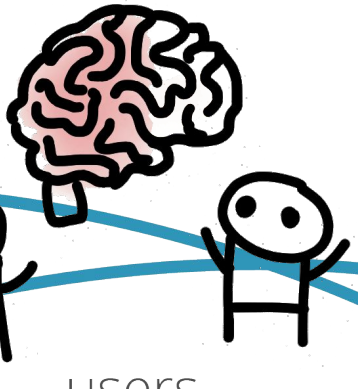
To be a leader in promoting
*the **collection, stewardship and (re)use***
Of Earth science data, information and knowledge
that is responsive to societal needs.



ESIP COMMUNITY

Brain trust of Earth & environmental science data people

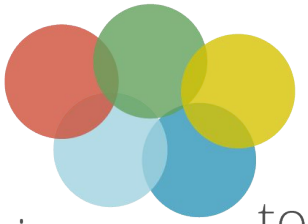
Multiple Science Domains



users

Corporate

data providers



application developers

data archives

tool & system developers

Academia

Cross-Agency

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ESIP Collaboration Areas

Standing Committees

- **Data Stewardship**
- **Education**
- Information Technology and Interoperability
- **Semantic Technologies**

Working groups

- Visioneers
- Data Management Training

Clusters

- **Ag & Climate**
- **CLEAN Network**
- Cloud Computing
- Community Data
- **Community Resilience**
- COPDESS
- Community Ontology Repository
- Data to Decisions
- Data Model
- **Disaster Lifecycle**
- Discovery
- Documentation
- Drones
- Earth Science Data Analytics
- Energy & Climate
- Energy & Climate
- **EnviroSensing**
- **Information Quality**
- **IM Code Registry**
- **Machine Learning**
- **Marine Data**
- Research Data Mgmt
- **Research Object Citation**
- Science Communication
- Science Software
- Sustainable Data Mgmt
- **Usability**
- VR/AR
- Web Services

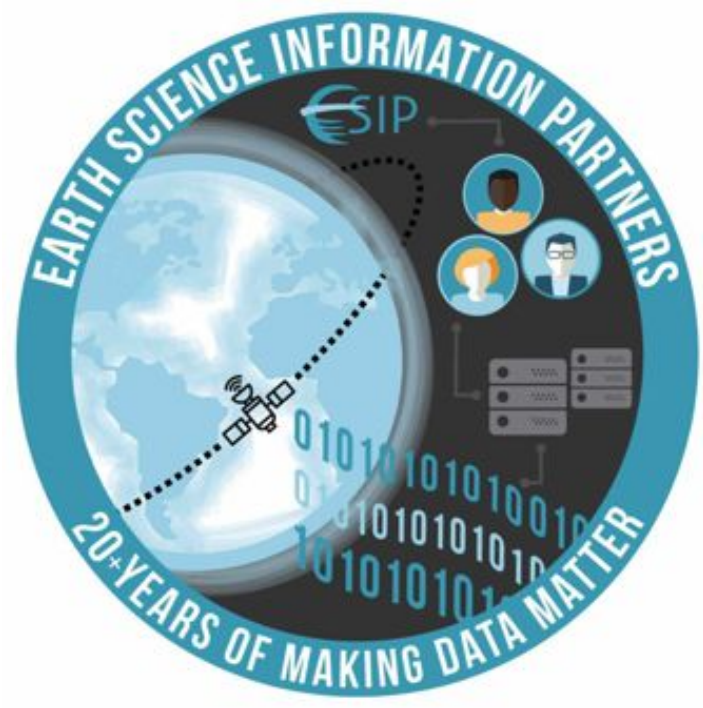
Presenting today

http://esipfed.org/collaboration-areas

ESIP Collaboration Area Highlights Webinar

- Agriculture and Climate Cluster (Ellie Davis)
- CLEAN Network Cluster (Patrick Chandler)
- Community Resilience Cluster (Rupu Gupta)
- Data Stewardship Committee (Matt Mayernik)
- Disaster Lifecycle Cluster (Dave Jones)
- Education Committee (Becky Reid)
- Envirosensing Cluster (Scotty Strachan)
- Information Management Code Registry Cluster (Colin Smith)
- Information Quality Cluster (Rama Ramapriyan)
- Machine Learning (Yuhan Rao)
- Marine Data Cluster (Jocelyn Elya)
- Research Object Citation Cluster (Mark Parsons)
- Semantic Technologies Committee (Lewis McGibbney)
- Usability Cluster (Sophie Hou)

Presentations



Data in Action: Increasing the Use and Value of Earth Science Data and Information

April 19th, 2019 | Webinar #1

What do storytelling, soils data standards, and research data lifecycle have in common?

ESIP Agriculture and Climate Cluster!

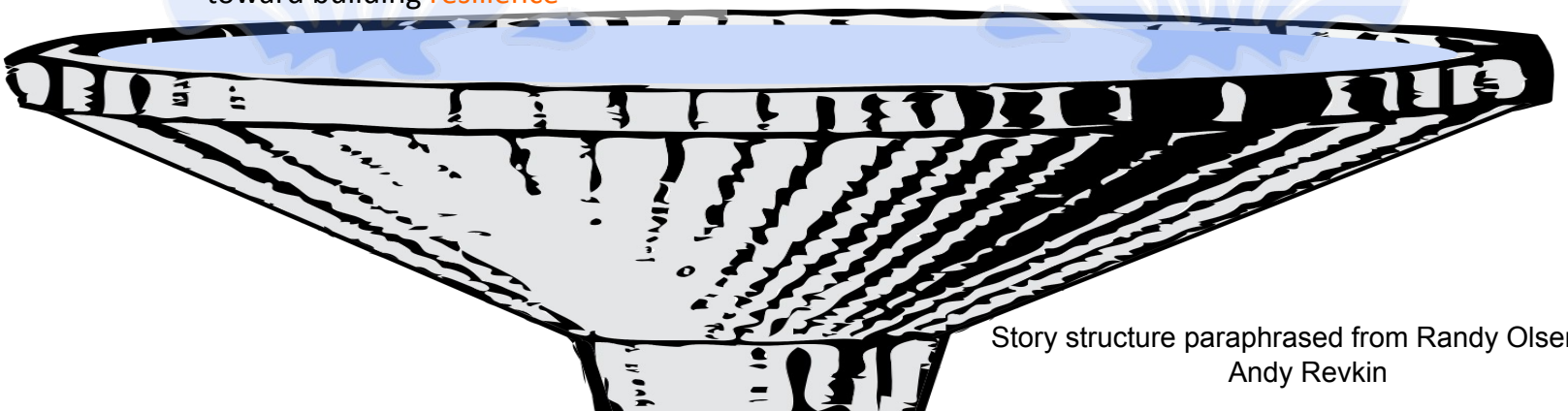
Co-chairs
Bill Teng (William.l.teng@nasa.gov)
Nancy Hoebelheinrich (nhoebel@kmotifs.com)

Climate Resilience Toolkit Case Studies

Brief (400 – 800 words)
stories (ideally, with a struggling protagonist)
highlighting examples (that others can follow)of
real people or communities who recognize
climate-related issues and take some action
toward building resilience

Our Story Structure

_____ and _____,
(main character) (goal)
but _____, therefore _____.
(obstacle) (solution)



Story structure paraphrased from Randy Olsen via Andy Revkin

ESIP CRT Workshop

(main characters)

ESIP Ag & Climate Cluster

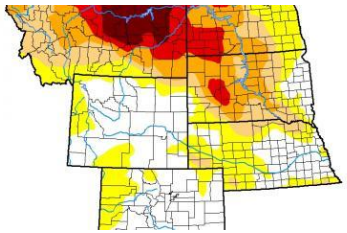
U.S. Climate Resilience Toolkit

USDA Agricultural Research Service

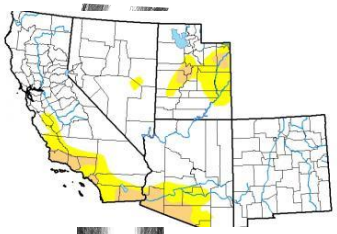
ltar

USDA Climate Hubs U.S. DEPARTMENT OF AGRICULTURE

Northern Plains Climate Hub

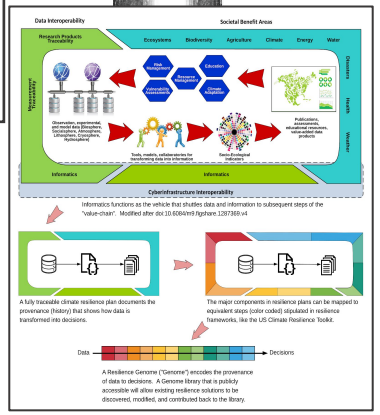


Southwest Climate Hub



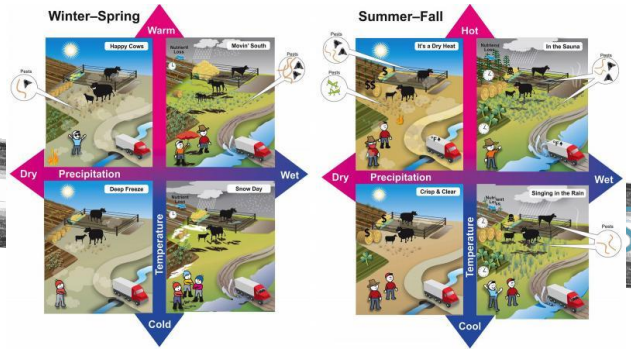
AND

Midwest Floods



Data to decisions provenance: ESIP Lab project to encode provenance for selected CRT case studies

(Goal)



BUT

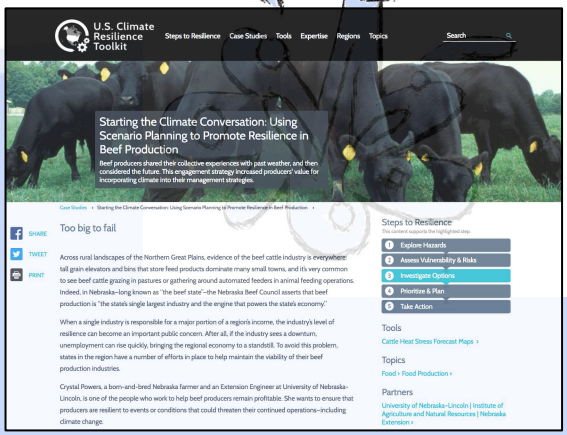
(Obstacle)

Scenario Planning to Promote Resilience in Beef Production

THEREFORE

(Solution)

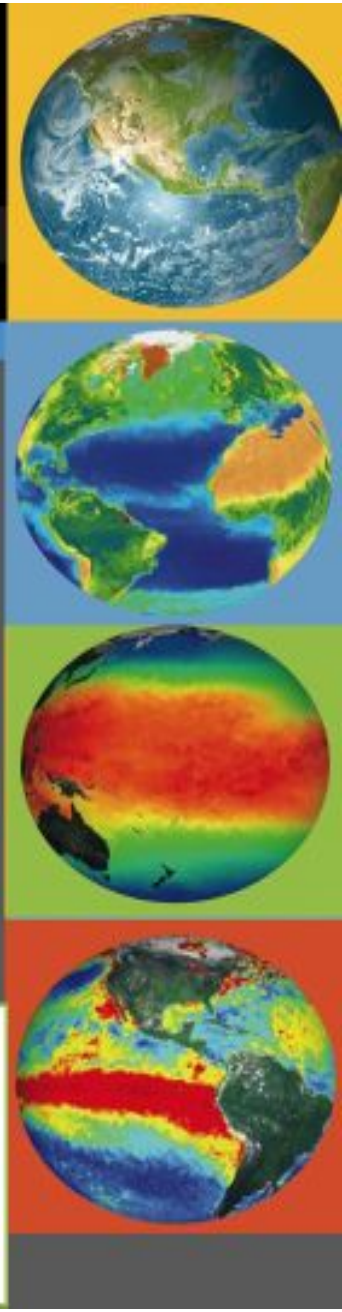
Climate Change



2019 ESIP Summer Meeting:
Workshop on Soils Data Standards & Disasters
July 18, 2019
Tacoma, WA

CLEAN

CLIMATE LITERACY & ENERGY AWARENESS NETWORK



Networking and Capacity-Building for Climate Change Education Since 2008

Co-Chairs: Frank Niepold & Anne Gold

Program Manager: Katie Boyd

ESIP Fellow: Patrick Chandler

NOAA · NSF · TERC · CIRES · SERC the Science Education Resource Center at Carleton College · U.S. DEPARTMENT OF ENERGY

CLEAN

CLIMATE LITERACY & ENERGY AWARENESS NETWORK

CLEAN Network

The CLEAN Network is a professionally diverse community of over 570 members committed to improving climate and energy literacy locally, regionally, nationally, and globally, to enable responsible decisions and actions. The CLEAN Network has been a dynamic group since 2008 and is now led by the CLEAN Leadership Board established in 2016.

Join the CLEAN Network » Email list archive »

Tuesdays at 1pm Eastern time CLEAN Network members meet in a teleconference to collaborate and share information about their literacy work, upcoming events, opportunities for collaboration or funding. Frequently guest speakers present on the topic of climate and energy literacy.

Recent and upcoming telecon topics and speakers »

Educators

Search or browse the Collection of Climate and Energy Educational Resources and learn more about teaching climate and energy science.

CLEAN Collection »

Resource Developers

See the multiple ways in which developers can participate in strengthening the collection of educational resources.

Partners

Learn about the variety of organizations that partner with CLEAN.

CLEAN Priorities

- Increasing integration of the CLEAN Collection, support guides and network programs for the millions of educators
- Supporting and growing the CLEAN Collection and Network (ESIP scientists & fellows)
- Identifying and promoting effective climate change education, community engagement, and workforce development
- Developing new partnerships and strategies for sustaining and increasing funding

Community Resilience Cluster

Rupu Gupta, New Knowledge Organization Ltd.

- Goal of ESIP's Community Resilience Cluster
  - To enhance community resilience through culturally meaningful improvements to data accessibility and informatics tools.
- Recent work
  - White paper for future publication
  - Problem statement: What is needed to make the transition of "scientific data and information for scientists" to "scientific data and information for public use"?

Community Resilience Cluster

- Wiki Page Updates
  - Resources and news about our cluster
- Question posed for the group
  - How have other clusters worked with partners/stakeholders/audiences to ensure meaningful use of data?

Get Involved:
Join our Community Resilience Cluster!

Wiki page: http://wiki.esipfed.org/index.php/Community_Resilience

Teleconferences: 3rd Wednesday of the month at 4:00 pm Eastern

Join the email list:
https://lists.esipfed.org/mailman/listinfo/esip-communityresilience

Join the Slack Channel: Join ESIP Slack
(https://esip-slack-invite.herokuapp.com/),
then find #communityresilience channel

ESIP Data Stewardship Committee

Mission: Promote excellence in Earth science data stewardship including preservation, information quality, and development of a cadre of excellent data managers for the future

Current Activities:

- Citations (Mark) ✓
- IQC update (Rama) ✓
- Data Risk paper (Matt)
- DataAtRisk.org (Sophie & Ruth)
- ISO Preservation Content Standard (Rama)
- Data Management Training Clearinghouse (Nancy)

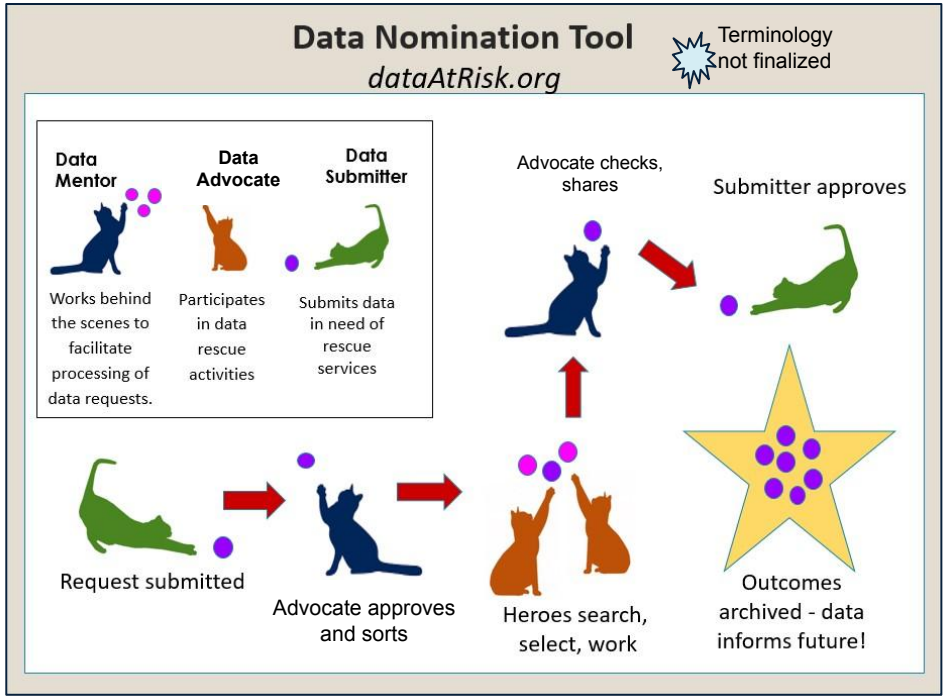
Wiki: http://wiki.esipfed.org/index.php/Preservation_and_Stewardship
Email list: http://lists.esipfed.org/mailman/listinfo/esip-preserve
Monthly telecons: First Thursday of the month at 2 pm Eastern,
https://global.gotomeeting.com/join/453694565

Current Activities (not reported elsewhere)

Data Risk Assessment

- How to assess what data are at risk?
- How to characterize what risk factors data face?
- How to make risks more transparent?

Data Risk Categorization Method	**Loss of funding**	**Missing files**	**Lack of metadata**
1. Length of recovery time			
2. Impact on user			
3. Who is responsible for addressing the problem			

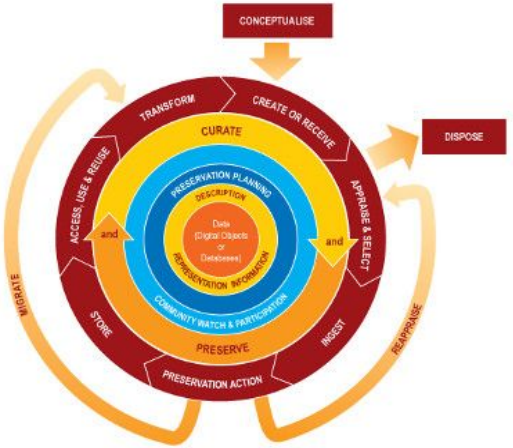


Current Activities (not reported elsewhere)

ISO Preservation Content Standard Status *

- Approved internationally as a Committee Draft
- Being edited to account for comments
- Next Step is to promote to a Draft Information Standard.
- History:
  - Provenance and Context Content Standard initiated by ESIP Data Stewardship Committee (2011) led to NASA Preservation Content Specification (PCS)
  - ESA generated Long Term Data Preservation (LTDP) Contents led to CEOS Preserved Data Set Content (PDSC)
  - PCS + PDSC led to ISO 19165-2

Data Management Training (DMT) Clearinghouse

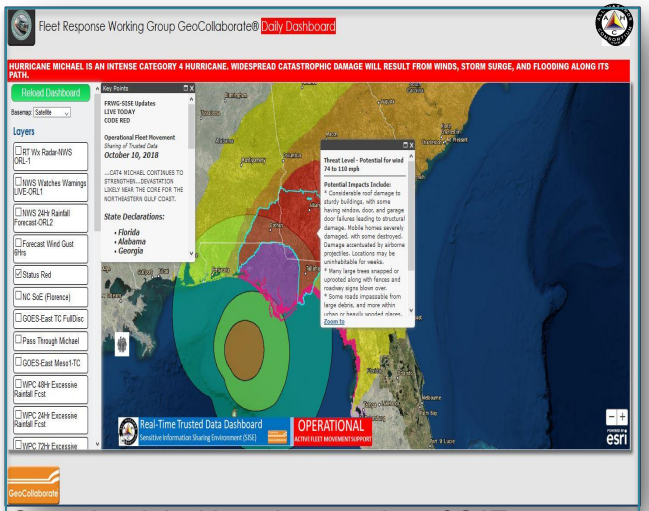


- 310 training resources published
- 100 more in the publication queue
- 2 working groups needing more members
  - Metadata enhancement
  - Assessment frameworks

For questions or feedback, please contact clearinghouseEd@esipfed.org.

* ISO 19165-2 – Geographic information -- Preservation of digital data and metadata -- Part 2: Content specifications for Earth observation data and derived digital products

ABOUT: *Trusted Data. We collaborate with emergency managers to improve data-driven decision making in a Sensitive Information Sharing Environment (SISE)*



Operational dashboard screenshot of CAT4 Hurricane Michael approaching landfall, October 10, 2018, highlights threat levels and state emergency declarations

Introducing new products, e.g., NASA Airborne Science Data

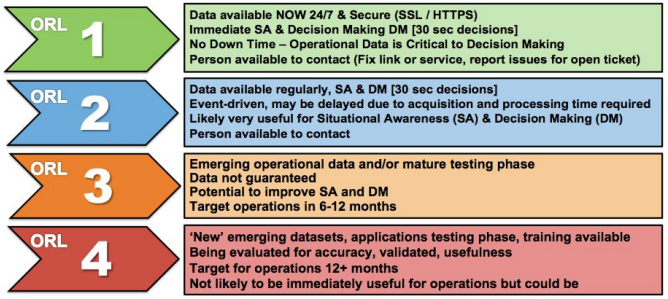
UAVSAR aboard NASA G-III aircraft imaged Napa County, California on October 16 to observe areas affected by several wildfires that started on October 8 and burned thousands of buildings as well as vineyards and forests.

NEW AND NOTEWORTHY

- **GeoCollaborate® Dashboard** Adopted by All Hazards Consortium, AHC [ESIP Testbed Success]
- **ORL** Definitions/Criteria adopted by AHC & Duke Energy for 2018 Hurricane Florence
- **ORL approach** endorsed by AHC partners in federal, state and private sector emergency managers, including FEMA & DHS National Infrastructure Coordinating Center, NICC
- **Data Driven Decision Making (3DM)** Quarterly workshops hosted by AHC for public / private stakeholder collaboration
- **ESIP Webinar "Managing disasters through improved 3DM"** Nov. 2018 see

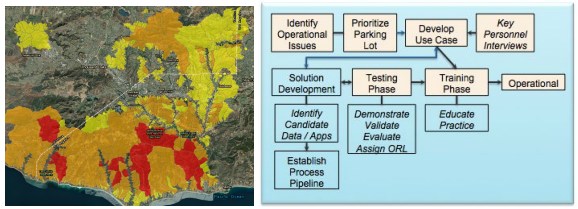
https://tinyurl.com/YouTube-ORL

ORL Definitions



NEXT STEPS:

1. Identify trusted operational datasets for improved situational awareness and decision making
2. Identify challenging datasets that can be tested in operational environments (i.e. soil type after wildfires)
3. Evolve Operational Readiness Level (ORL) framework
4. Establish a process pipeline for trusted data
5. Look into Disasters Community Terms and Semantics
6. Provide link with evolving science data and operational decision making
7. Develop training packages



Evolve ORL Framework with a communications model
- Use Case driven approach connecting users with earth science data
- Capture user terminology, in their words, by analyzing user websites & text sources
- UseNatural Language Processing to identify terms & meanings and test with users

Disasters Lifecycle Cluster

Want to learn more?
http://wiki.esipfed.org/index.php/Disasters

Disasters Lifecycle Cluster

Maturing Operational Readiness Levels – ORL Framework for Disasters Applications

- ***Trusted Data*** is defined through **partnerships** with emergency managers to improve data-driven decision making in a Sensitive Information Sharing Environment
- ORL defines 4 levels of **readiness**, i.e. usefulness and trust **per Use Case**
- Goal is to restructure processes into a **repeatable framework**, i.e. capture the underlying concepts about trusted data to support decision makers in specific situations
- Key component is a **communications model** to capture **user terms** in their words

Get Involved

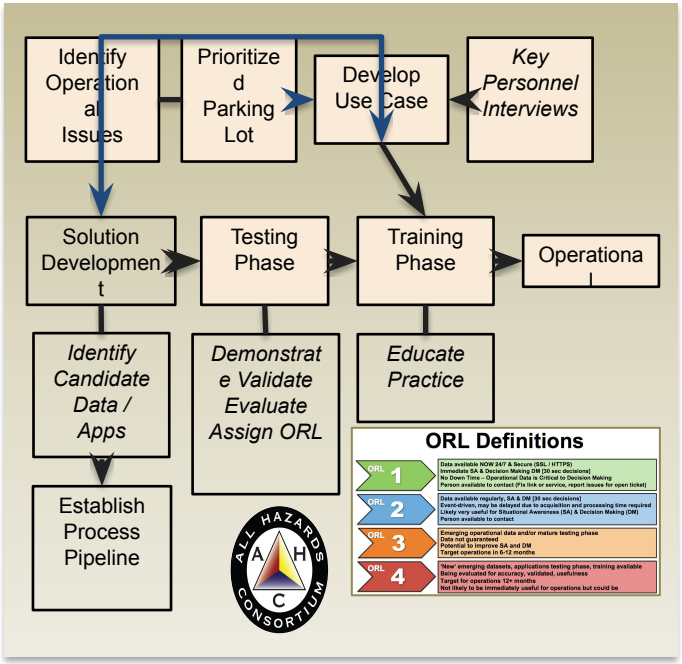
Disasters Lifecycle Cluster

Monthly Telecon: 1st Thursdays @4 ET

http://wiki.esipfed.org/index.php/Disasters

karen.moe@earthlink.net Karen Moe

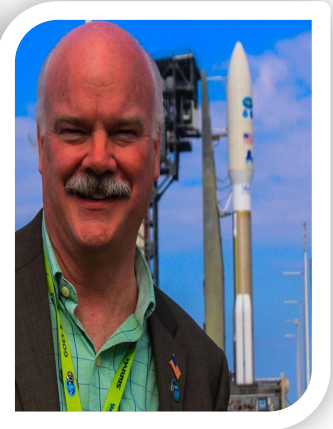
Dave@StormCenter.com Dave Jones



Key Ideas to building trust

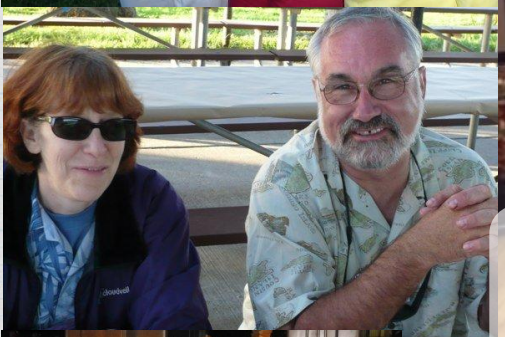
- Align with Partners
- Listen to their Issues
- Understand their Use Case
- Offer Solutions
- Test within their Trusted Environment
- Usability is key

Karen Moe



Dave Jones



Who is ESIP Education?






ESIP-Ed: What Do We Do?

- Share Data Tools via Out To Lunch Webinars
- Bring Coding Competence to Classroom Teachers
- Share ESIP Member learning resources
- Enable students to collect local data with Pocket Labs
- Host Educator Workshop at Summer Meeting

Join Us! Share Your Ideas and Resources

Telecon Every Third Thursday

http://wiki.esipfed.org/index.php/Education

Out To Lunch Webinars

Check out the Archives at:

http://wiki.esipfed.org/index.php/Education/Out2Lunch

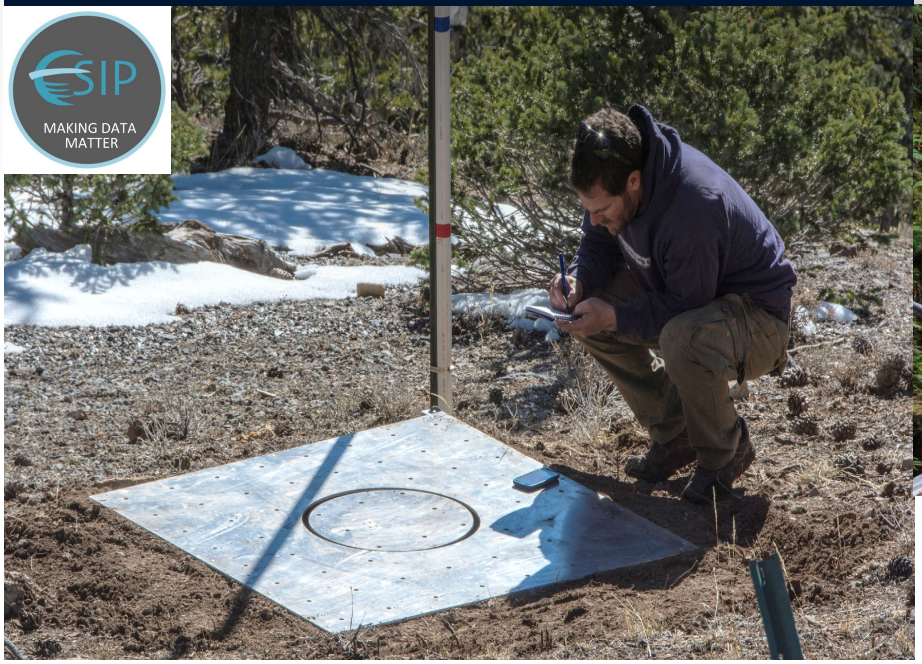
Join the Data in Action Teacher Workshop in Tacoma:

https://sched.co/O40g

ESIP EnviroSensing Cluster

Chairs: Renée Brown, Scotty Strachan

- Open group of scientists
- Best Practices community
- How to move science forward
- Tool development
- Collaborate & share
- Meets monthly, 1st Tuesday
- Students welcome!



http://wiki.esipfed.org/index.php/EnviroSensing_Cluster

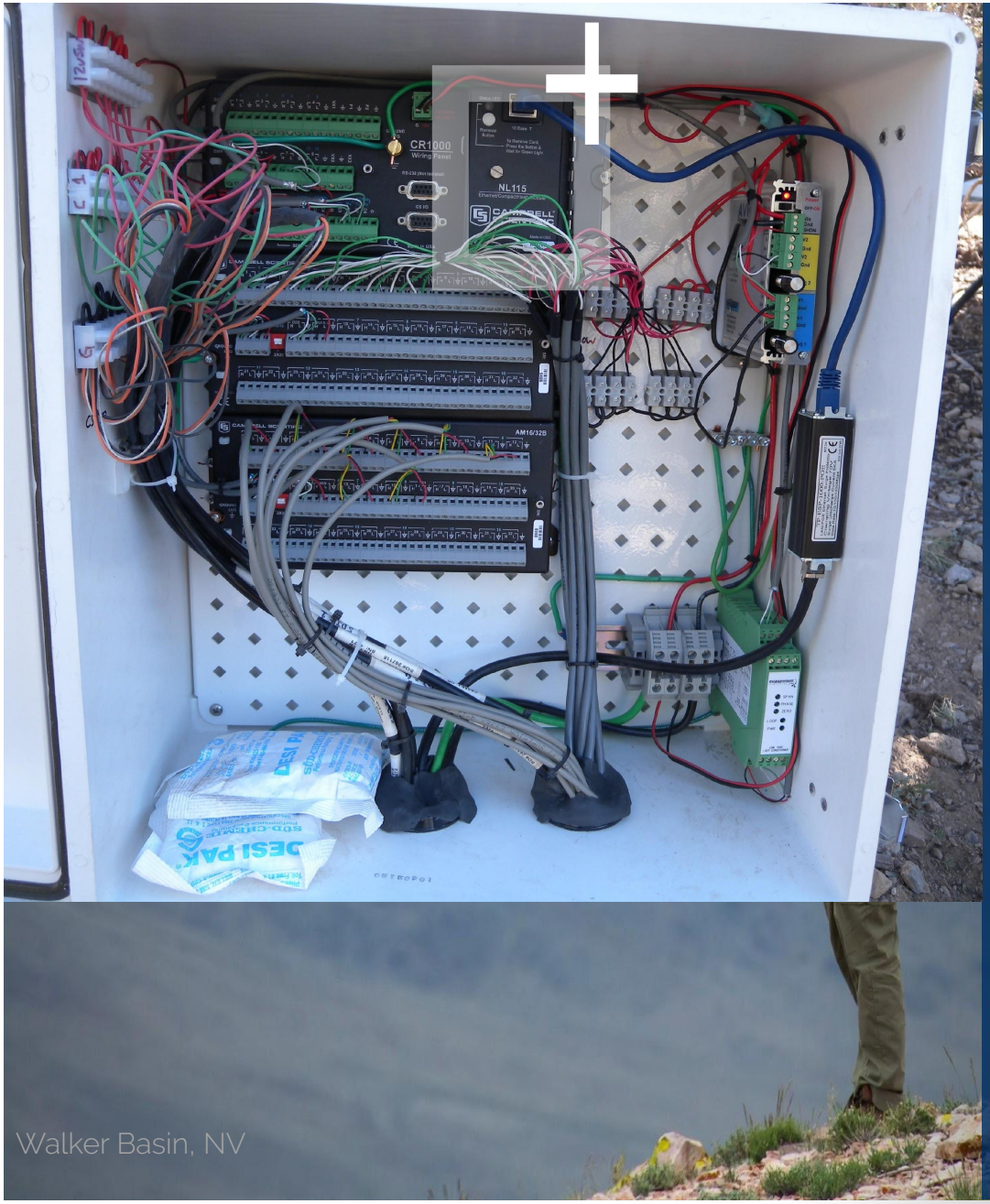
IOT, OR SENSOR TECH, IS REVOLUTIONIZING ENVIRONMENTAL SCIENCE

Benefits

- Inexpensive way to scale research
- Direct-to-digital observations
- Unattended operation
- Potential for better comparability
- Multiple lines of evidence

Risks

- Device-before-management
- Multiple modes of error
- Perception of accuracy
- Long-term degradation
- Vaporware data, metadata



Walker Basin, NV

ENVIROSENSING CLUSTER ACTIVITIES 2018-19

- Guest presenters / internal proj.
- Data QA/QC issues
- ESIP Lab QC pilot w/CHORDS
- Engagement with agencies (EPA, USGS, NOAA)
- Outreach to ARDC, SensorSpace
- Meeting sessions (AGU, anyone?)
- Awareness of cyberinfrastructure
- Sounding board for projects/tool development

http://wiki.esipfed.org/index.php/EnviroSensing_Cluster

The Information Management Code Registry

Improving information management by facilitating discovery of software solutions for information management needs.

Goals:

- Create a comprehensive registry of IM software that is searchable by task and software attribute.
- Highlight coverage gaps and shift redundant effort to new development.

Activities:

- Registry implementation (done)
- Controlled vocabulary (Alpha-release)
- Software curation (ongoing)
- Automate metadata maintenance (future)
- Highlight gaps (future)

Get involved:

- bit.ly/IMCRwiki

ESIP Information Quality Cluster

Hampapuram “Rama” Ramapriyan[1], Ge Peng[2], David Moroni[3]

[1]Science Systems and Applications, Inc. & NASA Goddard Space Flight Center

[2]North Carolina State University, Cooperative Institute for Climate and Satellites - North Carolina (CICS-NC) at NOAA’s National Centers for Environmental Information (NCEI)

[3]Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA

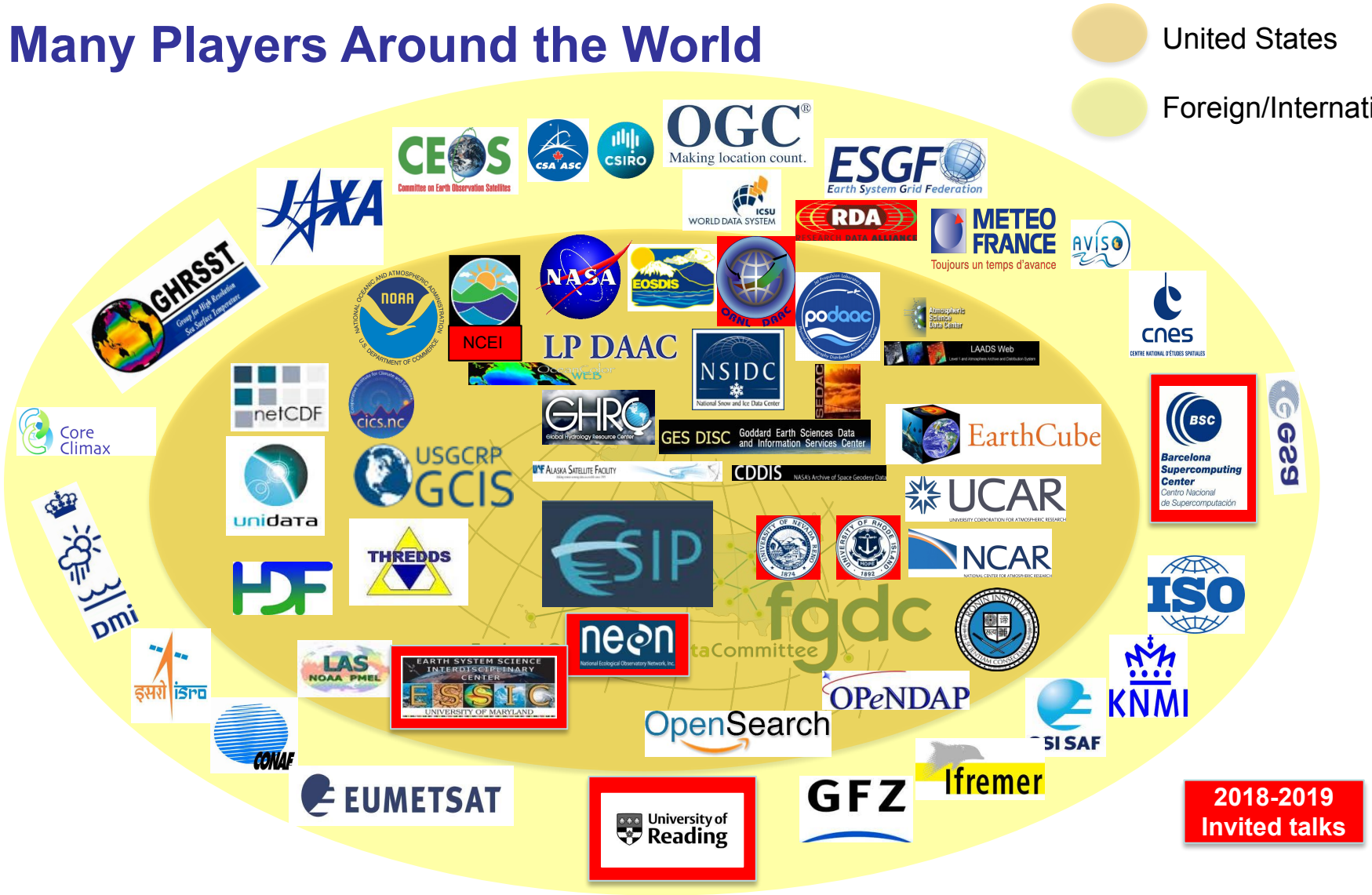
Presented at the ESIP Collaboration Area Highlights Webinar – April 19, 2019

ESIP Information Quality Cluster

- Vision
  - Become **internationally recognized** as an **authoritative and responsive information resource** for guiding the implementation of **data quality standards and best practices** of the science data systems, datasets, and data/metadata dissemination services.
- Information Quality = {Science Quality, Product Quality, Stewardship Quality, Service Quality}
- What do we do?
  - Share experiences; collaborate internationally; invited speakers at monthly telecons; sessions/papers at AGU, AMS, ESIP meetings
  - Maintain wiki site with many useful references http://wiki.esipfed.org/index.php/Information_Quality
- Publications
  - Peng, G. *et al.,* 2016: Scientific stewardship in the Open Data and Big Data era - Roles and responsibilities of stewards and other major product stakeholders. *D.-Lib Magazine.* **22**, doi:10.1045/may2016-peng.
  - Ramapriyan, H K, Peng G, Moroni D, Shie C-L, **Ensuring and Improving Information Quality for Earth Science Data and Products**. D-Lib Magazine, 23 (7/8), July/August 2017, DOI: **https://doi.org/10.1045/july2017-ramapriyan**
  - Moroni, et al.(22 authors), “Understanding and Communicating Uncertainty in Earth Science Data Informatics”, White Paper (in preparation)

ESIP Information Quality Cluster

Many Players Around the World



Machine Learning Cluster

Why

To help the ESIP Community apply machine learning effectively in Earth and space science.

When

Suggested at ESIP 2018 Summer Meeting

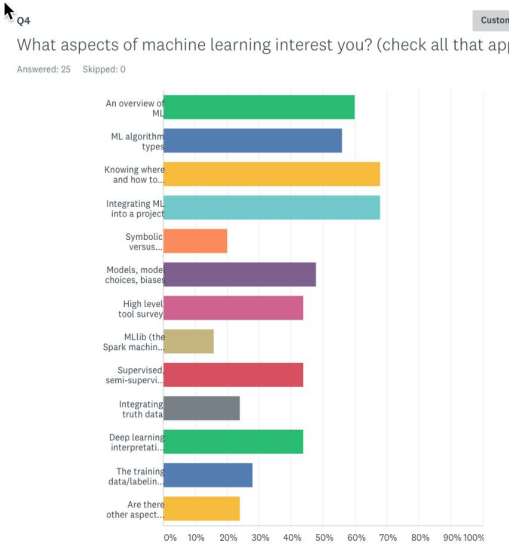
Formed August 2018

Fall Community Survey

Two interested sub communities

- Those interested in introductory material
- Those who have experience and seek to share and learn further

Survey results, notes here:
https://docs.google.com/document/d/1KmsA56XP88_Hw93KFtyz5soNVIVuUSTI4_QdmB7Ico4/edit#heading=h.m95gutl06fn4



Current Areas of Interest

Curated Datasets, ML Introductory material

Interest in a ‘repository’ of data sets useful in ML:
https://docs.google.com/document/d/1zABh20qEp9AIhHG7bsYAzNzoqitenZhqJa9Rv-v_4K8/edit

ML introductory material:
https://docs.google.com/document/d/1CD0AKd-JCY0qiEIgrM0y1XJI1oS5Ra0680VStqBgQuM/edit

These are currently working together...

Intersection with semantics

GeoSemantics Symposium, in conjunction with ESIP Summer Meeting in Tacoma:
https://sched.co/MKH5

Tagging, labeling, vocabulary mapping, ...

Get Involved In The Machine Learning Cluster

Ways to Play

Join existing efforts

Present something relevant of interest to you
- ...at a telecon
- ...at a meeting session

Help shape plans and summer meeting activities now!
- speakers
- tagging hackathons
- relevant training topics
- and more

Contact Info, Logistics

http://wiki.esipfed.org/index.php?title=Machine_Learning

Telecons, 3rd Friday (12 PM Eastern Time), monthly

Join our listserv!
esip-machinelearning@lists.esipfed.org

Marine Data Cluster

Explore critical topic areas in informatics such as

Data Management
Interoperability
Data Analytics
Data Quality
Cloud Computing

but specifically related to the marine environment
(anywhere in or over water)

Calls every 2nd & 4th Thursday at 1:30 PM ET

http://wiki.esipfed.org/index.php/MarineData

2019 Focus Areas

NetCDF-CF Compliance

- Compliance checkers
- Rosetta tool for converting CSV to netCDF-CF ✓
- Parameter reconciliation ✓

Best Practices for Software Implementation

- Version control systems ✓
- Preparing web services for AWS
- Data servers (ERDDAP, THREDDS) ✓
- Linked data, linking versions

Best Practices for Managing Marine Data Types

- CCHDO CF compliant netCDF data ✓
- Hurricane Hunter data ✓
- 24 Hz CTD data
- Transmissometer and fluorometer
- NCEI netCDF decision tree
- Storing and sustaining best practice resources

Resource Object Citation Cluster

- New cluster spun of the Data Stewardship Committee and in combination with the Software and Services Citation Cluster
- First task: update data citation guidelines.
  - Refinement core concepts and issues and mapped concepts to more metadata dialects
  - New guidance on “Dynamic data citation” notably to use the RDA Recommendation
  - New section on resolving citations: especially how to construct landing pages and make them machine actionable.
- Now examining all the “concerns” and research objects that citation can or should address.

Resource Object Citation Cluster

Data Citation Guidelines for Earth Science Data Version 2

Suggested Citation:

ESIP Data Preservation and Stewardship Committee. 2019. *Data Citation Guidelines for Earth Science Data. Ver. 2.* Earth Science Information Partners. https://doi.org/10.....

Table of Contents

April 2019 Updates
ESIP Semantic Technologies Committee

Dr. Lewis J. McGibbney, Data Scientist JPL/CalTech

GeoSemantics Symposium info can be found at
http://bit.ly/geosemantics19

Join the ESIP Semantic Technologies community mailing list:
esip-semanticweb@lists.esipfed.org
Or email Lewis –
lewis.j.mcgibbney@jpl.nasa.gov

science-on-schema.org

science-on-schema.org is provides guidance for publishing schema.org as JSON-LD for the geosciences. Specifically, it provides solid guidance on describing ***Data Repositories*** and ***Datasets*** in JSON-LD using the schema.org vocabulary.

The committee is currently working on evangelizing this work in collaboration with the RDA Data Discoveries Paradigms community and will be proposing **science-on-schema.org** to the ESIP Program Committee as a candidate for formal endorsement by the ESIP assembly.

Those interested in this work should head over to the ESIP semantic Technologies Committee mailing list or get in touch on Github.

https://github.com/ESIPFed/science-on-schema.org

ESIP Summer GeoSemantics Symposium

The SemTech Committee is excited to be planning and hosting our 3rd annual GeoSemantics Symposium co-located with the ESIP summer meeting in beautiful Tacoma, WA. The theme for this years symposium is ***Building Harmony between Data Semantics and Machine Learning*** so this event will provide an excellent platform for us to grow collaborations between those ESIP communities. We will also be hosting various sessions at the ESIP summer meeting.

The event will offer attendees a full morning of presentations from recognized subject matter experts followed by a full afternoon of hands-on workshops hosted by the likes of Amazon Web Services, Microsoft, ESRI. We will also be facilitating a Drone Data API event towards the end of the day.

More information can be found at http://bit.ly/geosemantics19

AGU Workshops

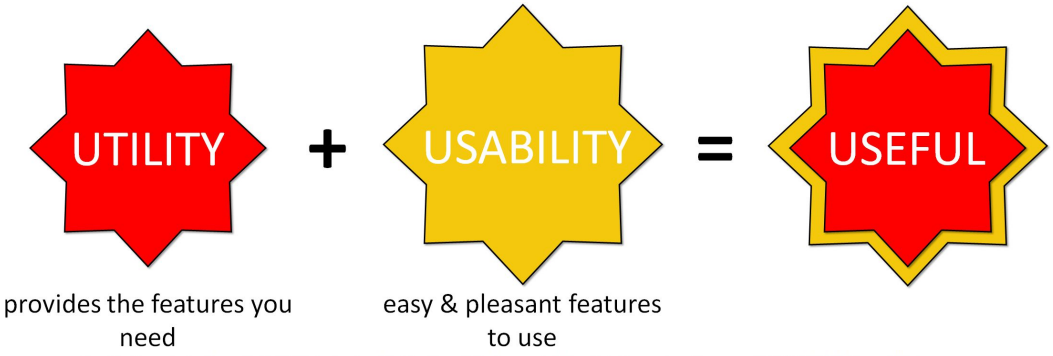
The SemTech Committee hopes to run two workshops at this year's AGU Fall Meeting which returns once again to beautiful San Francisco, CA, 9-13 December 2019.

1. **geoschemas.org: publishing schema.org as JSON-LD for the geosciences**; provide the "complete practitioners guide" for those interested in learning about and using schema.org metadata to describe dataset and data repositories across the geosciences, and
2. **1st AGU Fall Meeting Geoscience Community Ontology Engineering Workshop (GCOEW);** bring together multidiscipline semantic technologists from across Earth and space science informatics to work in a hands-on fashion to advance the role of semantic technologies within FAIR.

Usability Cluster

http://wiki.esipfed.org/index.php/Usability

- ***Key Goals:*** Foster the adoption of usability research and evaluation techniques for human-facing capabilities provided by data services.



Graphic above adapted from: Nimit. (2013, September 19). *What is usability.* Accessed at https://nimitmangal.wordpress.com/2013/09/19/what-is-usability/

- ***Past Products & Contributions:*** Usability Test Framework, project consultation, and training presentations/sessions.

Do you have usability needs? Should the cluster stay in hibernation?
Let us know! esip-usability@lists.esipfed.org

Questions?

Data in Action: Increasing the Use and Value of Earth Science Data and Information

April 19th, 2019 | Webinar #2

Data in Action Webinar Series

Upcoming Webinars

- May 17th, 1 pm ET: The Fourth National Climate Assessment: Translating Data to Inform Decisions

- More webinars will be announced soon: https://www.esipfed.org/webinars.
- Webinar recordings will be shared on the ESIP YouTube Channel: https://www.youtube.com/channel/UCfQZ-8G7ptfbvbhii3T30OA?view_as=subscriber.

Engagement Ops.

DISCOVER

Find people and tools to make your data findable, accessible, interoperable, and reusable.

COLLABORATE

Join-in or create a new collaboration area around your Earth science data challenges.

INNOVATE

Utilize small-grant funding to build or expand Earth data technologies.

NETWORK

Extend your network. Build connections across federal agencies, the private setor, and academia.

JOIN

Encourage your organization to join ESIP's 110+ member organizations. Unlock membership benefits: start new collaborations, apply for funding, and more.

Stay up-to-date on all things ESIP by signing up to receive Monday Updates: http://eepurl.com/rJQYn.

https://www.esipfed.org/onepager

Call for sessions ends 4/26!

Learn more, submit sessions, & register:
esipfed.org/summermeeting

2019 Summer Meeting

July 16-19, 2019

Greater Tacoma Convention Center, Tacoma, WA

Thank you!


ESIP
SUMMER MEETING 2019
JULY 16-19, 2019
TACOMA, WA
ESIPFED.ORG/SUMMERMEETING
DATA IN ACTION
INCREASING THE USE
AND VALUE OF EARTH SCIENCE
DATA AND INFORMATION
ESIP is supported by NASA, NOAA, and USGS