## Enabling FAIR Data in the Earth, Space, and Environmental Sciences

Data Matters: Ethics, Data, and International Research Collaboration in a Changing World

March 15, 2018 Shelley Stall AGU Director, Data Programs sstall@agu.org @ShelleyStall





## **American Geophysical Union**

- > 60,000 members across 144 countries
- 20 peer-reviewed scholarly journals
- 100 year anniversary coming in 2019
- Scientific meetings
- Eos.org online and print magazine

Galvanizes a community of earth and space scientists that collaboratively advances and communicates science and its power to ensure a sustainable future.



# AGU's Board has adopted an updated Ethics Policy as of 14 September 2017

"Defining harassment as scientific misconduct sets the highest standard for behavior in placing harassment on equal footing with fabrication, falsification, and plagiarism in a research environment."

- From the Prow Blog

By Eric Davidson, AGU President, Robin Bell, AGU President-elect,

and Margaret Leinen, AGU Past President

## AGU Ethics – the Opportunity as a Professional Society

- Promote and codify professional behavior
- Enforce sanctions tied to code-ofconduct and Policy
- **O** Educate and support members
  - Workshops and training
  - #SafeAGU /SafeOSM
  - o <u>stopharassment.agu.org</u>
  - Sponsor studies
  - New teaching tools
  - Collaborations and positive incentives for a changed culture
  - Track progress



Contact: Billy M Williams AGU VP Ethics, Diversity and Inclusion



# Scientific Integrity and Ethics in the Geosciences (Special Publications) 1st Edition

Editor, Linda C. Gundersen, retired USGS, Office of Science Quality and Integrity, Task Force on Scientific Ethics, AGU

### Section III. Scientific Integrity and Ethics in Publications and Data

Chapter 8. The New Landscape of Ethics and Integrity in Scholarly Publishing, Brooks Hanson

Chapter 9. Scientific Integrity and Ethical Considerations for the Research Data Life Cycle Linda C. Gundersen

Gundersen Linda C. (Ed.) Scientific Integrity and Ethics in the Geosciences 2017, p. 336, American Geophysical Union, Wiley, ISBN 978-1-119-06778-8

## AGU's position statement on data affirms that

"Earth and space sciences data are a world heritage. Properly documented, credited, and preserved, they will help future scientists understand the Earth, planetary, and heliophysics systems."



## **Researcher Challenges with Data Use**

The top four issues accounted for 73% of respondents



## **FAIR Guiding Principles**

FAIR is... Findable Accessible Interoperable Reusable

Article in Nature journal *Scientific Data*: Wilkinson,
M. D. *et al.* The FAIR Guiding Principles for
scientific data management and stewardship. *Sci. Data* 3:160018 doi: 10.1038/sdata.2016.18 (2016).



## **TRUE STORY – Dec 1, 2016**

In the 3 June issue, *Science* published the Report "Environmentally relevant concentrations of microplastic particles influence larval fish ecology" by Oona M. Lönnstedt and Peter Eklöv (1). The authors have notified *Science* of the theft of the computer on which the raw data for the paper were stored. These data were not backed up on any other device nor deposited in an appropriate repository. *Science* is publishing this Editorial Expression of Concern to alert our readers to the fact that no further data can be made available, beyond those already presented in the paper and its supplement, to enable readers to understand, assess, reproduce, or extend the conclusions of the paper.

#### LETTERS

Edited by Jennifer Sills

## Editorial expression of concern

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#### Jeremy Berg

Editor in Chief

#### REFERENCE

1 0. M. Lonnstedt, P. Eklov, Science 352, 1213 (2016).

Published online1December 10.1126/science.aah6990

## Retraction – May 3, 2017

### **Editorial Retraction**

Jeremy Berg

See all authors and affiliations

Science 03 May 2017: aan5763 DOI: 10.1126/science.aan5763

# absence of original data for the experiments reported in the paper;

University has not yet concluded its own investigation, the weight of evidence is that the paper should now be retracted. In light of the Board's recommendation and a 28 April 2017 request from the authors to retract the paper, *Science* is retracting the paper in full.

### New Grant from Laura and John Arnold Foundations (LJAF)

Align publishers and repositories in following best practices to enable FAIR and open data and to create workflows so that researchers will have a simplified, common experience when submitting their paper to any leading Earth and space science journal.

This will accelerate scientific discovery and enhance the integrity, transparency, and reproducibility of this data.

## **Enabling FAIR Data Project - Objectives**

- FAIR-compliant data repositories will add value to research data, provide metadata and landing pages for discoverability, and support researchers with documentation guidance, citation support, and data curation.
- FAIR-compliant Earth and space science publishers will align their policies to establish a similar experience for researchers. Data will be available through citations that resolve to repository landing pages. Data are not placed in the supplement.

## **FAIR-Compliant Repositories**

Services Provided:	Benefits:	
Metadata support: Repository, Datasets, Citation	Supports Discovery, Understanding, Reuse Repository: NSF 418 project, re3data.org Dataset: Repository determined, community-driven Citation: Roadmap, ESIP, RDA	
Persistent identifiers	Supports Data Citation and Credit for Data and Reuse	
Data Citation / Landing page compliance	Supports Best Practices and Common Experience for Researchers [Roadmap for Data Citation for Scientific Repositories, elements 1-6]	
Publication Peer Review Support	Supports access for publication peer reviewers even if data isn't public yet.	
Licensing policies (data and software)	Supports reuse of data and software.	
Common list of approved FAIR- compliant repositories	Supports researchers locating compliant repositories. [re3data / FairSharing] Supports <u>publishers</u> individually determining endorsement.	

## **FAIR-Compliant Journals**

Services Provided:	Benefits:
Common data and software citation policies and practices	Supports best practices and providing a common experience for all researchers. Data are no longer placed in the Supplemental Information [Roadmap for Data Citation for Scholarly Publishers] Improves research credit for data and reuse. [Scholix]
Common workflows for data citations	Supports best practices and providing a common experience for all researchers. [THOR Project Outcomes – Data Linking]
Common expectations for publication peer review when evaluating science and determining if the data and metadata are adequate.	Supports publication peer review process. Identifies the role of reviewer vs. repository when it comes to evaluating the cited data (and software).



### PLOS ONE Data Availability: 20% Currently in Repositories



## Timeline – 18 Months (@ 11 months remaining)

Preparation for 1st Stakeholder Meeting (Complete)	Aug 1, 2017 – Nov 15, 2017
First Stakeholder Meeting (Complete)	Nov 16 – 17, 2017
<ul> <li>Working Groups Formed and Active</li> </ul>	Nov 17, 2017 – Apr 2018
Development of Guidelines, Recommendations, and Policies for Journals and Repositories	Nov 17, 2017 – Apr 2018
<ul> <li>Testing of Guidelines, Recommendations, and Policies</li> </ul>	Apr 2018 – July 2018
Second Stakeholder Meeting	July 2018
<ul> <li>Adoption and Implementation of Guidelines, Recommendations, and Policies Begins</li> </ul>	July 2018

## Community-Driven Project – Partnership Includes:

#### • Science Data Communities

- AGU
- Earth Science Information Partners (ESIP)
- Research Data Alliance (RDA)
- EarthCube / Council for Data Facilities
- Publishers
  - AGU
  - Proceedings of the National Academy of Sciences (PNAS)
  - Nature
  - Science/AAAS
  - Elsevier
  - PLOS

- International Repositories (300+)
- National Computational Infrastructure (NCI)
- AuScope
- Australian National Data Service (ANDS)
- Center for Open Science
- DataCite
- ORCID
- CrossRef
- CHORUS
- Scholix

## And Growing!!

## Take Aways...

- Community-driven solution with AGU as convener
- Builds on the work previously done by COPDESS.org
- Data associated with publication will be open "by default"
- Quality of data documentation (metadata) becomes consistent – supports FAIR principles
- ESS Publishers and Repositories adopt project recommendations and guidelines







### ADVANCING EARTH AND SPACE SCIENCE

## **Enabling FAIR Data – Project Orientation Material**

Article describing the Enabling FAIR Data Project:

https://eos.org/editors-vox/enabling-findable-accessible-interoperable-and-reusabledata

Outcome of the initial Stakeholder Meeting from Nov 16-17, 2017: <u>https://eos.org/agu-news/enabling-fair-data-across-the-earth-and-space-sciences</u>

DataONE webinar recording: <u>https://www.dataone.org/webinars/enabling-fair-data</u>

Enabling FAIR Data (high-level) Project Site: <u>http://www.copdess.org/home/enabling-fair-data-project/</u>