A Research Object-based Toolkit to Support the Earth Science Research Lifecycle

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Abstract*—Data-intensive science disciplines, like Earth Science, are increasingly producing and consuming a variety of digital resources during the course of a scientific investigation. Instead of having these resources in isolated repositories, scientists are seeking ways for managing and making these resources available from a single place, and at the same time they are also increasingly interested in the adoption of FAIR principles to enhance the visibility and reusability of scientific results. This has called for new methods to improve the access and communication of results. Research Objects are a key building block towards realising this vision. They provide a structured way (a model) to describe scientific resources related to an investigation, along with the context in which they were used and the people involved. But research objects are as useful in practice as the availability of tools supporting their adoption. In this paper, we present a toolkit, tailored for Earth Sciences, comprising a set of services and applications around research objects that support scientists throughout the research lifecycle to manage, share, find and reuse scientific results, and we discuss initial insights into the community adoption

***Index Terms*—Research Objects; Knowledge Sharing and Reuse; Earth Science; ROHub**

I. Introduction

This document provides a paper-style view of the Research Object (RO) "*A Research Object-based Toolkit to Support the Earth Science Research Lifecycle*"[1] generated . The RO has been created, managed and preserved via ROHub platform [1]. Please refer to [2] for a general introduction to the RO concept, to [3] for a detailed description of the RO model, and to [4] for more information about ROHub platform.

The RO is of type *"Bibliographic", which is intended mainly for the aggregation of bibliographic resources, bibliographic references, or documents (e.g., grey literature) that are a relevant to a specific topic.* [2].

An overview of this RO is depicted in Figure 1. Additionally, this RO has been enriched automatically with the following annotations:

- concepts (most frequently mentioned in the RO): *RO, course, metadata, Toolkit, scientists, community, research, Earth Sciences*
- domains (fields of knowledge in which the main concepts are commonly used): *statistics, programming*
- frequent expressions (most frequently mentioned noun phrases): *Ro concept, Ro vocabulary, Ro evolution API, Ro landing page*
- named entities (most frequently mentioned):
  - Places: *Poland, Madrid*

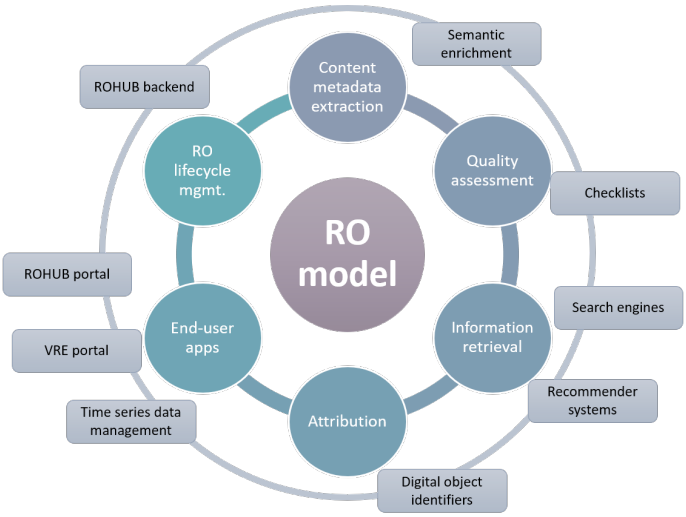

Fig. 1. Research Object Sketch

II. Resources

The resources encapsulated by the RO are summarized in table I

TABLE I
Research Object Resources

name	size	type
ROHub-portal.png	470.8 KB	Image
ROHub-web-traffic-0318-0718.png	135.0 KB	Image
ROToolkit-overview.png	162.5 KB	Sketch, Image
Seamonitoring-VRC-portal.png	2.0 MB	Image
Time-series-application.png	1.6 MB	Image
ROToolkit-ES-CR.pdf	1001.4 KB	Paper, BibliographicResource
ROToolkit-ES-CR.zip	4.3 MB	File

A. Key Resource details

- Name: *ROToolkit-ES-CR.zip*
  Description: *HTML version of the paper*

Acknowledgment

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[1] *http://sandbox.rohub.org/rodl/ROs/ROToolkit_ro2018/*
[2] See RO types definitions at http://w3id.org/ro/earth-science#

REFERENCES

[1] The Research Object Management Platform - ROHub http://www.rohub.org/.

[2] K. Belhajjame, O. Corcho, D. Garijo, J. Zhao, P. Missier, D. Newman, R. Palma, S. Bechhofer, E. García Cuesta, J. M. Gómez-Pérez, S. Soiland-Reyes, L. Verdes-Montenegro, D. De Roure, and C. Goble "Workflow-Centric Research Objects: First Class Citizens in Scholarly Discourse", Proceedings of Workshop on the Semantic Publishing, SePublica Crete, Greece 28 May 2012.

[3] Belhajjame K., Zhao J., Garijo D., Gamble M., Hettne K., Palma R., Mina E., Corcho O., Gómez-Pérez J. M., Bechhofer S., Klyne G., Goble C. "Using a suite of ontologies for preserving workflow-centric research objects", Journal of Web Semantics: Science, Services and Agents on the World Wide Web Available online 11 February 2015 ISSN 1570-8268.

[4] Palma R., Corcho O., Gómez-Pérez J. M., Mazurek, C. "ROHub - A Digital Library of Research Objects Supporting Scientists Towards Reproducible Science". In Semantic Publishing Challenge of Proc. Extended Semantic Web Conference (ESWC) Crete, Greece 25-29 May 2014