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Linked Data Scientometrics in Semantic e-Science

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Abstract:

The Semantic Web is inherently multi-disciplinary and many domains have taken advantage of semantic technologies. Yet, the geosciences are one of the fields leading the way in Semantic Web adoption and validation. Astronomy, Earth science, hydrology, and solar-terrestrial physics have seen a noteworthy amount of semantic integration. The geoscience community has been willing early adopters of semantic technologies and have provided essential feedback to the broader semantic web community. Yet, there has been no systematic study of the community as a whole and there exists no quantitative data on the impact and status of semantic technologies in the geosciences. We explore the applicability of Linked Data to scientometrics in the geosciences. In doing so, we gain an initial understanding of the breadth and depth of the Semantic Web in the geosciences. We identify what appears to be a transitional period in the applicability of these technologies.

Keywords: Semantic Web; Semantic Technologies; scientometrics; Semantic, e-science

1 Introduction

Scientometrics is the science of measuring and analyzing science itself, such as a discipline's structure, growth, change, and interrelations (Hood & Wilson, 2001). Vassily Nalimov first coined the term in the 1960s and subsequent work focused on a discipline's methodologies and principles as well as individual researchers' scientific output (Braun, Glänzel, & Schubert, 2006; Hirsch, 2005). The Linked Open Data Cloud has allowed for new types of scientometrics (Hu et al., 2013). Building upon the Linked Open Data (LOD) approach to scientometrics, we explore the scientometrics of the Semantic Web's influence in the geosciences.

The Semantic Web lends itself to multiple disciplines and, thus, many domains have adopted semantic technologies. The Geoscience discipline is leading the way in Semantic Web adoption and validation (McGuinness et al., 2009). Astronomy, Earth science, hydrology, and solar-terrestrial physics have seen a substantial amount of semantic integration (Dalton, 2007). The geoscience community has been willing early adopters of semantic technologies and have provided essential feedback to the semantic web community (McGuinness et al., 2009). This application of semantic technologies to geoscience research has been labeled semantic e-Science (Fox & Hendler, 2009). While there have been several studies of how semantic e-Science benefits researchers (Narock & Fox, 2012; Narock et al., 2010; Pouchard et al., 2013) there has been no systematic study of the community as a whole.

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