# Improving mutual understanding in Geosciences with the help of terminological tools.

Sabina Di Franco (1) and Elena Rapisardi (2)

(1) CNR-IIA. Istitute of Atmospheric Pollution, National Research Council, Italy (difranco@iia.cnr.it), (2) CNR-IBIMET. Institute of Biometeorology, National Research Council, Italy;Institute of Biometeorology, National Research Council, Italy (e.rapisardi@ibimet.cnr.it)

The rules for an effective communication process clearness, precision, correctness, and consistency, are true in all communication areas and science communication and information are no exception to these rules. As a matter of fact, in science we need to share information and data with colleagues, to store and search datasets, to translate in other languages, to teach, to inform and persuade public, stakeholders, media and policymakers. We must also consider that in the last few years the complexity and plurality of the disciplines related to geosciences, and earth science in general, have increased. The domains of these disciplines, that form a complex interlinking network, are frequently overlapping, and mutual understanding is sometimes taken for granted whereas each discipline has its specific jargon (Vilhena et al. 2013). The language is in itself rich of semantic ambiguity and polysemy and the meaning of each term has a high degree of context-dependency, for example, the word "mercury", depending on context refers to a planet, a chemical element, a Roman god or a famous rock star. For example, a geotechnical engineer will use the term "soil" having in mind properties such as density, porosity and resistance while an agronomist will use this term considering the organic content and fertility.

Moreover, knowledge organisation models have shifted to adapt to the increasing complexity from the tree of the Encyclopedia to the network, a geometrical arrangement more flexible and fit for connecting a knowledge system that is unprecedented in its richness but tangled and interlinked by definition.

Having said that, what could prevent us from drowning in this "ocean" of data and information (Gandomi and Heider 2015)? Terminological tools such as glossaries, thesauri and ontologies could be useful to help semantic searches and data retrieval, both for human purpose and use (metadatation, translation, concept understanding, data sharing) and machine to machine interactions.

Practical studies and comparison in other scientific and non-scientific domains reveal that terminological tools integrated into a knowledge management system, help a virtuous data circle for users and providers. The Unified Astronomy Thesaurus (UAT) has been proved relevant and useful across the entire discipline, regardless of content or platform (Accomazzi 2013). As for ontologies where: "standard ontologies and encodings can be used directly for science data, or can provide a bridge to specialized domain ontologies." (Richards 2017).

Nevertheless, frequently "a word is not enough". We should remember that concepts and their representation (words) do not always correspond and we have to minimise this "semantic entropy" to allow the message to be clear; we need feedback on tools, knowing if they are useful or not, in order to improve them; we must avoid misunderstanding that happens even in neighbouring field of geosciences. In particular, the scientists should take into account some tricky concepts when communicating science: concepts of model and probability; prediction and uncertainty; the scientific meaning of "error"; the role of scientists; time and size scale.