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How modellers frame uncertainty in scientific publications: review and reflections

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How modellers frame uncertainty in scientific publications: review and reflections

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Abstract: Uncertainty is recognised as an essential issue in environmental modelling. As modellers, we notably use a variety of tools and techniques within an analysis, for example related to uncertainty quantification and model validation. We also address uncertainty by how we present results. For example, experienced modellers are careful to distinguish robust conclusions from those that need further work, and the precision of quantitative results is tailored to their accuracy. In doing so, the modeller frames how uncertainty should be interpreted by their audience. This is an area which extends beyond modelling to fields such as philosophy of science, semantics, discourse analysis, intercultural communication and rhetoric. We propose that framing of uncertainty is a core practice of credible environment modelling, essential for teaching good modelling skills, and deserves greater attention. We need research to better understand different framing practices from the point of view of the author and the reader, and hence improve communication about uncertainty in our models. This presentation reports preliminary results of a study of these practices. Specifically, we analyse the framing of uncertainty that is visible in the abstracts from a corpus of scientific articles. We do this through textual analysis of the content and structure of those abstracts. Each finding that appears in an abstract is classified according to the uncertainty framing approach used, using a classification scheme that was iteratively revised based on reflection and comparison amongst three coders. Results of the analysis indicate how frequently the different framing approaches are used. Reflections on the classification process help understand the relationships between frames, how the frames relate to interpretation of uncertainty, and how rhetorical devices are used by modellers to communicate uncertainty in their work.

Keywords: uncertainty; scientific writing; philosophy of science