



Making Earth science concepts (in)visible : an enquiry into academic teaching of modelling

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The activity of Earth surface numerical modelling provides an enlightening process in which to observe the journey of geoscientific concepts. Many concepts are not developed from scratch, but transferred by the modeller from his or her past experience and theoretical knowledge. Often loaded with epistemic stances, these concepts consciously or unconsciously anchor the Earth scientist in particular schools and scientific networks.

When modelling is taught to university students, the selection of Earth science concepts is often made by the teaching staff. How do university lecturers select which concepts to transfer to their students, and with which objectives and implications? Answering these questions might help us to understand how Earth science concepts evolve over time and are passed on to future researchers. Adopting a methodology from social sciences to this aim, we conducted extensive interviews with university lecturers in a variety of Earth science disciplines in order to account for their approaches of the transfer process. Course material was additionally collected and analysed.

Our first results reveal two antagonist, yet co-existing approaches. In most interviews, modelling education was perceived by lecturers as an opportunity for black-box “unpacking”. The lecturers pursued the objective of making visible the concepts and formalizations their students might use in their future academic career. Before becoming “appliers” of concepts, the students were hence encouraged to look beyond the concepts and scrutinize their implications. At the same time, the interviewees considered themselves forced to render a variable amount of conceptualizations invisible, pre-made and black-boxed to the students. Concepts became mere buttons to click on and thus remained largely unexplained.

Which concepts the university lecturers shed light on – and which ones they let in the shadow – did not only amount to personal decisions. The two processes (“unpacking” and “black-boxing”) seemed tightly co-constructed by infrastructure, students’ curricula and skills, material and human networks, perceived role of lecturers within the institution and disciplinary conceptions, among others – and were constantly re-negotiated. Exploring this co-construction, as we propose to do, is not merely of interest from an educational perspective. Rather, the negotiations and compromises upon what to pass on to upcoming researchers has much to teach us about our current perception of the activity of modelling – and about how we conceive and build its future.