

Comprehensive and systematic knowledge quality assessment as a tool for model qualification

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In many applications - especially in those supporting decision-making - objective evidence-based confirmation that models and data meet the requirements (verification) and are fit for the purpose (validation) is warranted. This includes also a discussion of conceptual models, the scientific basis and alternative approaches. The models and data also need to be understandable and credible as well as transparently described in a sufficient degree. Whereas verification is rather technical in nature, and rather similar to quality assurance and quality control, validation is a broader concept. For some modelling applications a thorough validation in the sense of demonstrating representativeness to the system being modelled may not be possible except for limited parts. In such cases, other evidence of fitness for the purpose (e.g. benchmarking or less direct comparison with field observations) are needed, and building a convincing case of sufficiently high-quality of the modelling becomes less straightforward.

A set of tools are presented in this contribution, providing an effective means to demonstrate that a sufficient confidence in the outcome of the modelling and in its quality has been reached also in contexts where complete direct validation of the models is not possible. In addition to the models and data themselves, also the underlying assumptions are considered in the framework. Examples of earlier use of such tools include nuclear waste disposal, climate change assessments and pharmacology.