

Opportunities and limitations of software project management in geoscience and climate modelling

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Progress in geoscience and climate research is substantially based on numerical modelling. Models and their implementation in code are playing an increasing role in the scientific work. Earth System Models are becoming more and more complex and the extent and complexity of the underlying code is growing. Thus the requirements in software management also in scientific/academic projects have become more challenging and important. Modern software development strategies and management tools are therefore becoming more relevant in the different fields of geoscience.

During the last decades, the general process of software development has strongly improved. Software development tools and strategies, such as version control systems, issue tracking, agile software development, continuous integration, test driven development, data and resource management have been well established and are of special interest in the field of software development and software engineering for many years. In climate modelling, such tools like version control systems, have to some extent, already become an integral part in the scientific workflow. They are used, especially in scientific code development, high performance computing, and project management. But the general framework of scientific work differs fundamentally from that in software engineering. Research software projects in geoscience often have a different development history and structure. This has to be kept in mind when addressing the question, whether or how these software project management tools can be transferred and applied to such research projects. Furthermore, concepts and tools must be accompanied by policies reflecting the needs from the scientific process.

In this presentation, recent software project management tools and their possible advantages, disadvantages, and possible limitations will be discussed, with respect to their application in scientific/academic projects in climate modelling.