The benefit of integrative software platforms for models mutualisation and chaining: illustrations with Capsis and AMAPstudio

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The Capsis platform (Dufour-Kowalski et al., 2012) has been developed in France by scientists of the forestry field belonging to INRA and other research organisations to share and mutualise the modelling effort, since 1994 in the URFM lab in Avignon, then since 1999 in AMAP. This platform is dedicated to forest growth and yield or forest dynamics models. An open technical architecture, combined with a free license for the core software, a charter describing clearly the partners roles and an active supporting methodology resulted in the integration of more than 60 forest models in 19 years.

The AMAPstudio software suite (Griffon et Coligny, 2012) has been developed by AMAP since 2008 on the same technical and organisational bases than Capsis, but targeting the plants architecture modelling, one of the major research topic of the lab.

Investing in such a generic software approach offers good properties. The methodology asks to the modellers to invest in a short training to become a beginner developer, followed by a starting session together with a developer after which he will generally become enough autonomous to go on by himself with simple tools and a permanent technical support. The modeller being quite autonomous, he does not rely on the developer availability to work on his own models. This codeveloping way allows the developers to be in charge of the technical issues only, and the modellers to focus efficiently on their modelling questions. All along the developements, the reusable parts are identified and set apart in reusable libraries where they can be shared by several models.

Another emerging property in these generic software ecosystems is allowing models chaining. The software are primarily intended to host models for time dynamics of a plant or a vegetal scene (e.g. a forest stand). Having the simulation history in memory makes it possible to reevaluate it with secondary models for other purposes, e.g. optimisation, evaluation of risk (wind, fire, stopping rock blocks fall...), radiative balance, biomechanics, economics, evaluation of energy chain balance (fuel wood), wood quality.

References

Dufour-Kowalski S., Courbaud B., Dreyfus P., Meredieu C., de Coligny F., **2012**. Capsis: an open software framework and community for forest growth modelling. Annals of Forest Science (2012) 69:221–233.

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