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Design of a high-resolution land cover database for numerical modelling applications

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NWP and climate models as any applications relying on land surface modelling need a realistic representation of surfaces from which models' parameters are derived. At Meteo-France, the land cover description relies currently on a kilometric global database (ECOCLIMAP), that describes as precisely as possible the ecosystems fractions all over the globe and is interfaced to the SURFEX modelling platform to derive surface parameters for a limited number of surface types. The current ECOCLIMAP database is representative only of the 1999-2005 period. As the horizontal resolution of numerical model tends to increase to better capture small scale features, an accurate representation of the landscape is required.

In order to improve both the resolution and the realism of the land cover description, a new database named ECOSG, standing for ECOCLIMAP Second Generation was developed. ECOSG is designed to represent surfaces at a 300m resolution based on ESA-CCI global products combined to other high-resolution databases for towns, lake, etc., and offering the possibility of regular updates. ECOSG provides global decadal maps of parameters describing natural, urban and marine surfaces, and usable as input to land surface models.

The main principles of ECOSG will be presented, in particular what input data are used and what the basis of the algorithms are. It will then be compared to the previous ECOCLIMAP database to assess the impact on surface parameters such as leaf area index, height of trees, etc. Finally, preliminary tests that have been performed using the French operational AROME model will be shown, demonstrating that although the surface parameters are more realistic, numerical models' objective scores are not improved and that surface and upper air parameterizations need to be revised to adapt to the new surface representation.