



GPU based framework for geospatial analyses

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Parallel processing on multiple CPU cores is already used at large scale in geocomputing, but parallel processing on graphics cards is just at the beginning. Being able to use a simple laptop with a dedicated graphics card for advanced and very fast geocomputation is an advantage that each scientist wants to have. The necessity to have high speed computation in geosciences has increased in the last 10 years, mostly due to the increase in the available datasets. These datasets are becoming more and more detailed and hence they require more space to store and more time to process. Distributed computation on multicore CPU's and GPU's plays an important role by processing one by one small parts from these big datasets. These way of computations allows to speed up the process, because instead of using just one process for each dataset, the user can use all the cores from a CPU or up to hundreds of cores from GPU

The framework provide to the end user a standalone tools for morphometry analyses at multiscale level. An important part of the framework is dedicated to uncertainty propagation in geospatial analyses. The uncertainty may come from the data collection or may be induced by the model or may have an infinite sources. These uncertainties plays important roles when a spatial delineation of the phenomena is modelled. Uncertainty propagation is implemented inside the GPU framework using Monte Carlo simulations. The GPU framework with the standalone tools proved to be a reliable tool for modelling complex natural phenomena

The framework is based on NVidia Cuda technology and is written in C++ programming language. The code source will be available on github at <https://github.com/sandricionut/GeoRsGPU>

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