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A hydrogeological window is the area where contamination may quickly infiltrate from the Earth surface and upper aquifers into deep aquifers.

In Moscow, the midCarboniferous aquifer is considered as a strategic water resource; therefore, it should be protected from pollution.

The map of hydrogeological windows is accepted by the Ecology department of Moscow municipality to be used for rational nature management.

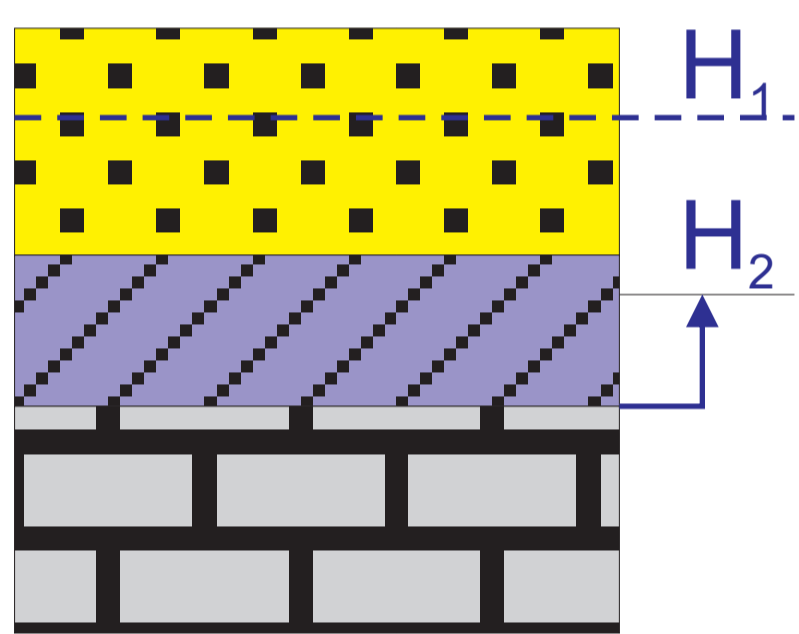
The Method of Mapping

The task is the zoning of territory by the time of filtration from the upper above-Jurassic aquifer to the midCarboniferous aquifer.

Quaternary aquitards including moraine loams and clays are not continuous and cannot provide effective protection for Carboniferous aquifers.

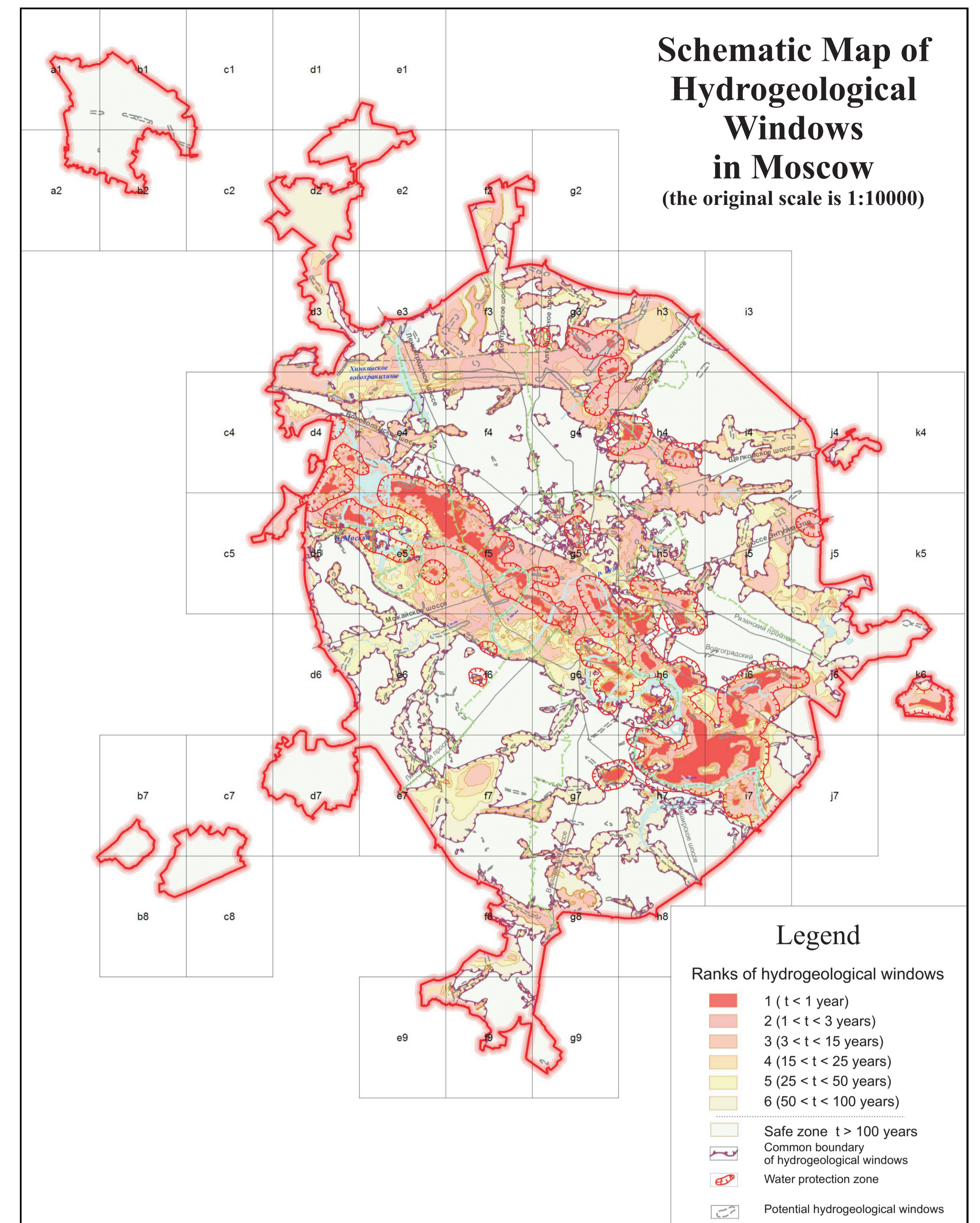
Only Jurassic and Carboniferous aquitards are included into the mapping procedure.

The filtration time through one aquitard is calculated as follows

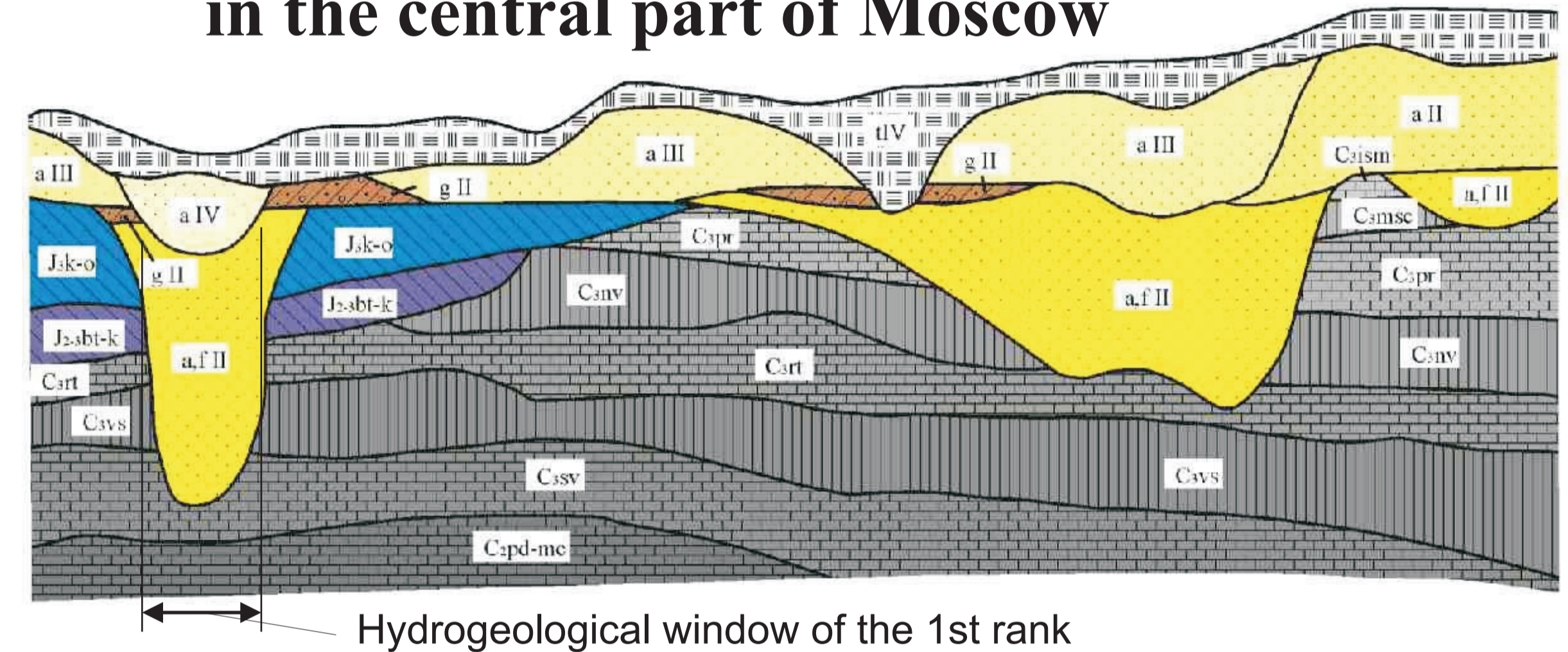


$$t = \frac{m^2}{k} \ln \frac{H_1}{H_2} n$$

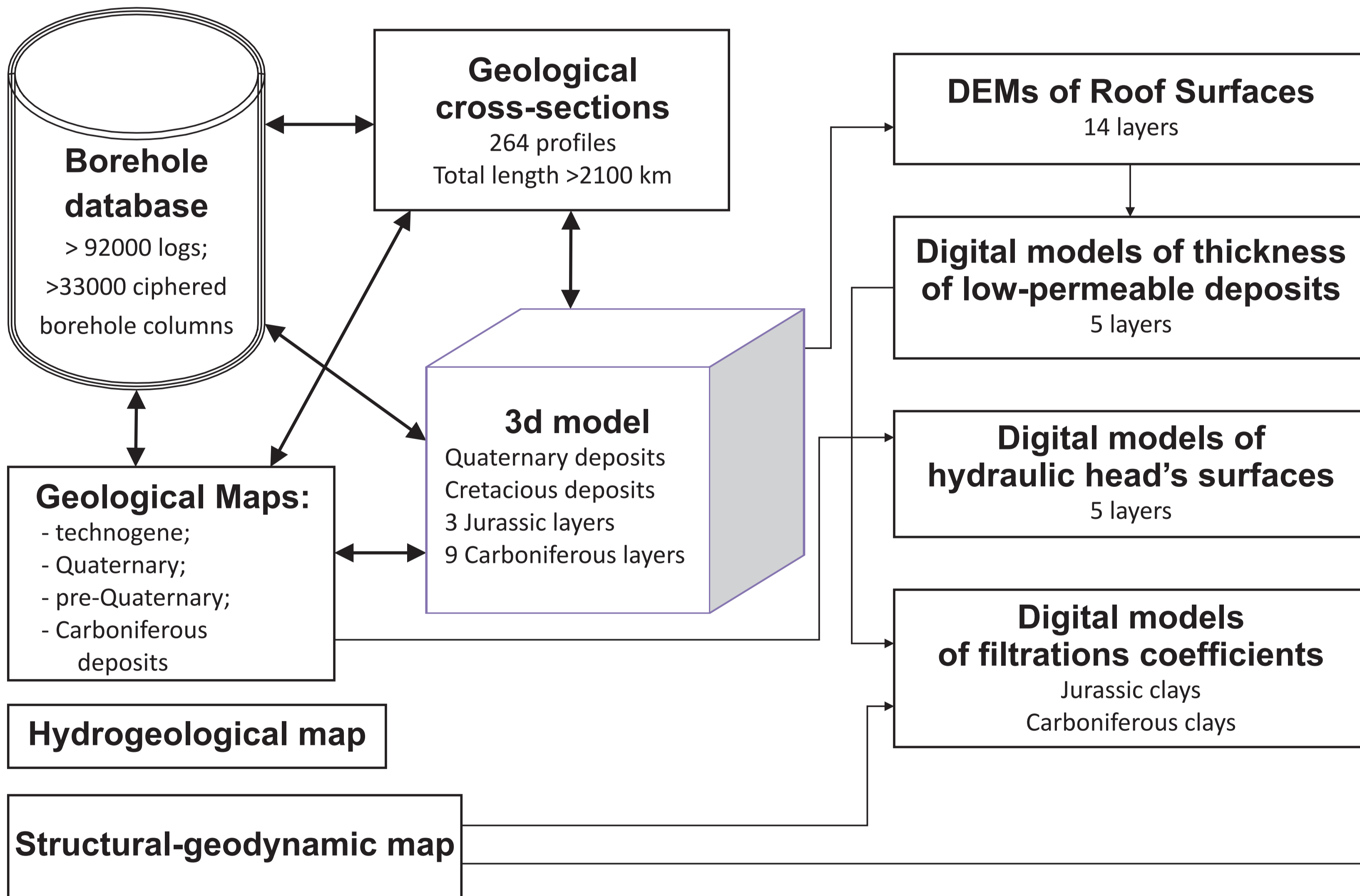
t - time of vertical filtration
 m - thickness of the low-permeable bed
 k - filtration coefficient of the low-permeable bed
 n – porosity of the low-permeable bed (=0.1)
 H₁ - head of the above-Jurassic aquifer
 H₂ - head of the Carboniferous aquifer



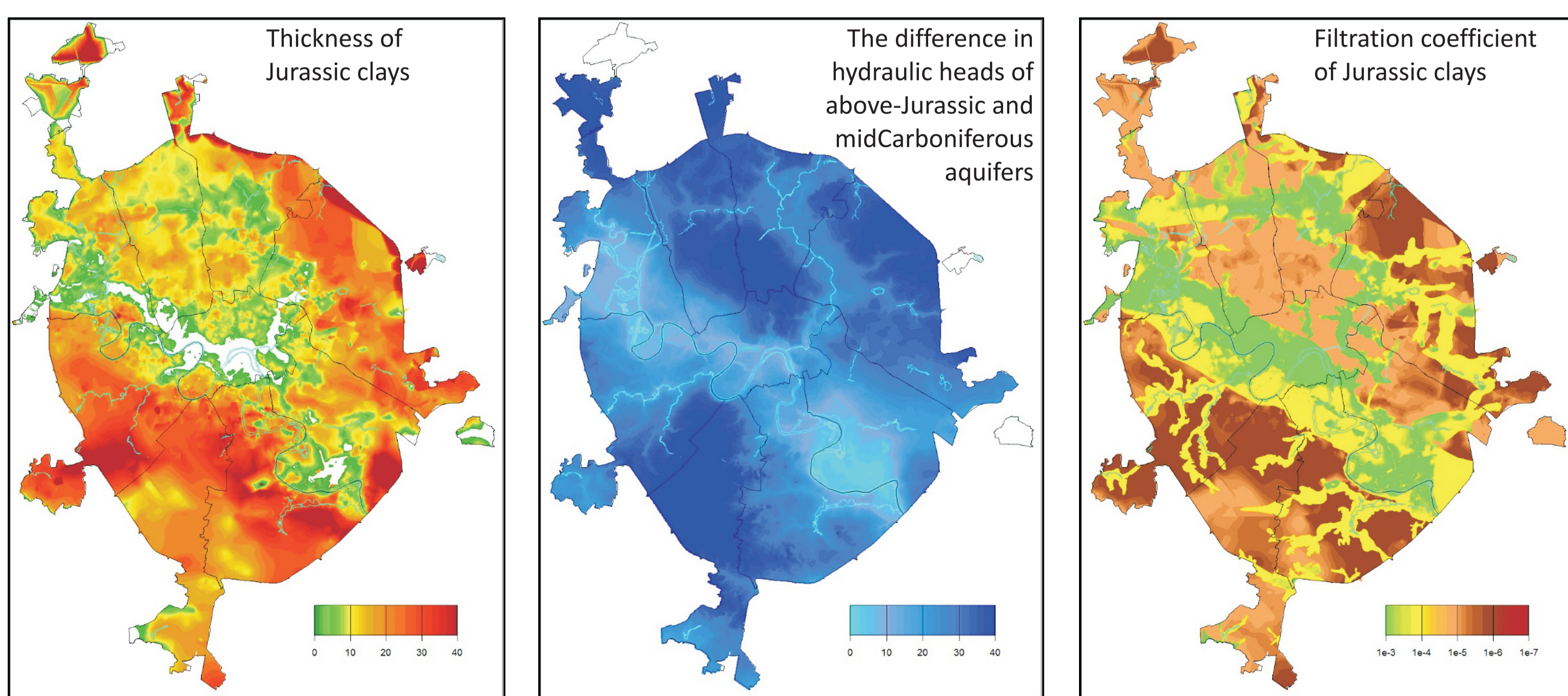
Typical geological cross-section in the central part of Moscow



Technological scheme of mapping



Intermediate digital models



Desktop for geological cross-section design

