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Local multipole development to reduce the number of satellite data in space-domain

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With the current and future large amount of satellite data, modelling the potential fields of the Earth becomes a challenging task with high demands on computer memory and time. Often the number of measurements, taken into account in inversions, is reduced simply be decimating them. Nevertheless, such "random selection" may obviously lead to loss of information.
We develop local mutipole development to overcome this drawbacks. We decompose the space-domain, i.e. a shell at satellite altitude defined by the measurements' positions, into a sum of geometrical 3D-bodies (triangular prisms). Each unity-volume contains a certain amount of field measurements points. As soon as the considered unity-volume is small enough, the data are located in the vicinity of one another and the field itself is smooth. The data points and the related field may be replaced by a power series development of local multipole development around the centre of the prism. We obtain a piecewise decomposition of the magnetic field at satellite altitude. The coefficients of each local development may then be used in global field modelling.