With the launch of the GOCE satellite, new measurements of Earth’s gravity gradients with unprecedented precision at 100 km resolution become available and considerably improve our knowledge of the gravity field at lithospheric scales. These data are usually modelled using a linear combination of spherical harmonics, which coefficients are obtained from a global optimization process. However, the regional variability of the gravity field can be better recovered by using a parameterization of the Earth’s potential in terms of local equivalent sources such as poles, multipoles or Poisson multipole wavelets. Such modelling approach is indeed better suited to introduce local a priori on the signal-to-noise ratio, and avoids the propagation of local measurements errors all over the globe. The derived models are thus expected to bring more information on the gravity signal, which is essential for geophysical and geodetic applications such as investigation of Earth’s structure at lithospheric scale or geoid determination. In this presentation, we show our approach of regional modelling of the GOCE gradients using Poisson multipole wavelets.