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Recovery of the gravitational potential at the Earth's surface by spectral combination of first-, second- and third-order radial derivatives of the gravitational potential measured by satellite sensors

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Recovery of the gravitational potential at the Earth's surface using spectral combination of the first-, second- and third-order radial derivatives of the gravitational potential at the satellite level is investigated in this contribution. A mathematical model is based on integral transforms of radial derivatives of the gravitational potential onto the gravitational potential and their spectral combination. The spectral combination is used in biased and unbiased forms. In numerical experiments, the performance analysis of the developed model for recovery of the gravitational potential in the area of the Himalayas is performed using radial gradients of the gravitational potential synthesised at a satellite level from a state-of-the-art global gravitational model. The high-resolution elevation model Earth2014 is used to represent the Earth's surface. Derived spectral weights proposed for transformation of the radial gradients of the gravitational potential onto the gravitational potential using the spectral combination method are verified by a closed-loop test.