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Inversion of monthly GRACE potentials for climate-based mass transports by a novel technique with locally adapted and increased resolution

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We show the applicability of a novel method called the Regularized Functional Matching Pursuit (RFMP) to the local analysis of mass transports. We consider monthly GRACE potentials for South America during one year and subtract a temporal mean. The resulting difference fields are denoised with Freeden's spherical wavelets. Finally, the obtained monthly potential anomalies are inverted for volumetric mass density anomalies with the RFMP. The calculated results clearly show seasonal variations in the mass density distribution in the Amazon area. For another application, we consider the detection of droughts and a flood in the summers of 2005 to 2010.
The novel technique combines the advantages of global basis functions (spherical harmonics) and local trial functions (splines or wavelets) and yields a resolution which is locally adapted to the detail structure of the solution. We believe that this can contribute to an increased spatial resolution of the result.