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# Applications of spherical splines and wavelets to planetary surface data

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In contrast to a flat 2-D plane, much of the data involved in geosciences live on the surface of a sphere ($S^2$). Representation of the unknown functions (data) defined on the sphere is a keystone for efficient data analysis and many relevant geoscientific applications. There are a variety of tools suited for the purpose, including spherical harmonics methods, which provide ideal frequency localization, and spherical spline and wavelet-based methods, which provide more space localization and flexibility. In this work, we demonstrate some applications, i.e., planetary surface data representations, using the more space-localized approaches. The spline- and wavelet-based methods could both be applied to the data, but with different features. The performance of the methods will be tested with two different kinds of data, one with the measured bidirectional reflection distribution functions (BRDF) for some Earth surface categories, and the other with a random surface height field. We plan to employ these spline- and wavelet-based methods when modeling the Earth's radiation pressure effects experienced by the GNSS satellites in orbit. These local radiation pressures can be further associated with the Earth's global spherical albedo, and thus with the Earth's radiation balance.