1086-31-1190 **Alain Plattner**, Princeton, NJ 08544, and **Frederik J Simons*** (fjsimons@alum.mit.edu), Princeton, NJ 08544. *Spatiospectral concentration of vector fields on a sphere: Applications to satellite geomagnetism.*

We construct spherical vector bases that are bandlimited and spatially concentrated, suitable for the analysis and representation of real-valued vector fields on the surface of the unit sphere, as arises in the natural and biomedical sciences, and engineering. Building on the original approach of Slepian, Landau, and Pollak we concentrate the energy of our function bases into arbitrarily shaped regions of interest on the sphere and within a certain bandlimit in the vector spherical-harmonic domain. As with the concentration problem for scalar functions on the sphere, the vector basis can be constructed by solving a finite-dimensional algebraic eigenvalue problem. The eigenvalue problem decouples into separate problems for the radial, and tangential components. For regions with advanced symmetry such as latitudinal polar caps, the spectral concentrationkernel matrix is very easily calculated and block-diagonal, which lends itself to efficient diagonalization. Like its scalar counterparts it should be a powerful tool in the inversion, approximation and extension of bandlimited fields on the sphere: vector fields such as gravity and magnetism in the earth and planetary sciences, or electromagnetic fields in optics, antenna theory and medical imaging. (Received September 19, 2012)