wobble period to within its observational uncertainty; models of the Earth having elastic material properties inferred from high frequency seismological observations appear therefore to predict with good accuracy the response of the real Earth at a period of fourteen months. We find also that more precise measurement of the Chandler wobble period is not likely to constrain strongly the structure of the Earth's fluid core, that estimates of wobble excitation by earthquakes based on a quasi-static calculation of the Earth's response are correctly computed, and that the coupling between wobble and spin induced by the geographically irregular distribution of the oceans is sufficiently slight that it is unlikely ever to be observed.

References

Dahlen, F.A.: The passive influence of the oceans upon the rotation of the Earth. Geophys. J. **46**, 363–406, 1976

Smith, M.L.: Wobble and nutation of the Earth. Geophys. J., 1977 (in press)

The Earth's Core-Mantle Interface Revisited

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Determinations of fluctuations in the length of the day have revealed changes due to the transfer of angular momentum between the Earth's "solid" mantle and the overlying atmosphere on time scales upwards of a few weeks, as well as the slower but more pronounced "decade variations" due largely (according to current ideas) to angular momentum transfer between the mantle and the Earth's liquid core. Improvements in techniques for monitoring the Earth's rotation (such as those afforded by recent advances in methods of ranging to artificial satellites and the Moon and of very-long baseline interferometry) should therefore lead to results of interest to meteorologists concerned with planetary-scale motions in the atmosphere and to geophysicists concerned with the magnetohydrodynamics of the core and the origin of the main geomagnetic field. The consideration of the stresses at the Earth's surface and at the core-mantle interface that bring about angular momentum exchange between the solid and fluid parts of the Earth raises a number of basic hydrodynamical questions requiring further experimental and theoretical research. In the case of the core, quantitative difficulties encountered by the suggestion that the stresses are electromagnetic in origin led to the idea of topographic coupling associated with hypothetical undulations of the core-mantle interface.

At a few kilometres in vertical amplitude, such "bumps" would not significantly influence seismic data but they would measurably distort the Earth's gravitational and magnetic fields and might account for a certain correlation between these fields. Indeed, it was as a direct outcome of a test of the "bumps" hypothesis that the correlation between the gravitational and magnetic fields was discovered. Having been introduced originally by the author in an attempt to account for the high variability of the frequency of geomagnetic polarity reversals and certain properties of the geomagnetic secular variation (for references, see Hide, 1977), the hypothesis is now supported by sufficient evidence to justify further work on its various implications for the Earth's internal structure and evolution. It will be particularly important in future work on the interpretation of long wavelength features of the geoid to take into account one direct implication of the aforementioned correlation between the Earth's gravitational and magnetic fields, namely that the broad features of the horizontal pattern of density variations in the mantle are probably characterized by a high degree of vertical coherence—much higher in fact than many workers have evidently been prepared to accept hitherto.

Reference

Hide, R.: Towards a theory of irregular variations in the length of the day and core-mantle coupling. Phil. Trans. Roy. Soc. London **A284**, 547–554, 1977