

Correction to "Slichter Modes and Love Numbers"

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We wish to correct some statements that appear in the fourth paragraph in the section of our paper (Crossley et al., 1992) headed **Dynamic Love Numbers**. There we conjectured that the Love number resonances correspond to the eigensolutions of some particular subset of the complete Earth model being used. In particular we stated that the ICB Love number resonances could be regarded as resonances of an inner core surrounded by an infinite homogeneous fluid of the same density as at the base of the PREM outer core.

This statement is physically invalid because an infinite mass of exterior fluid has infinite inertia. Moreover, by making numerical experiments (subsequent to our paper), we have found no actual physical model, based on a shell of homogeneous compressible fluid of any thickness exterior to the inner core, that yields eigenperiods identical with, or even close to, the Love number resonance.

Similar considerations destroy the interpretation of CMB Love number resonances as possible eigenperiods of the mantle filled by an interior fluid.

We therefore conclude, subject of course to further work, that the Love number resonances should not be interpreted as the periods of any related physical subset of the Earth model. When solving for the Love numbers at the ICB (e.g. Rochester and Peng, 1992), the only requirements are that the field variables are continuous there. It may not be surprising, therefore that attempts to interpret the Love number resonances in terms of a physical subsystem fail, though we admit this failure appears to be philosophically unsatisfactory.

The translational response of the inner core (or mantle) to 'external' disturbances χ and $d\phi/dr$ applied at the ICB

(or CMB), is given by a set of Love numbers which exhibit resonances. In the case of the ICB, one of these resonances is close enough to the actual Slichter eigenperiod as to render the Love numbers strongly frequency dependent. For the CMB, the resonance is further away but the frequency dependence is still significant. As noted in our paper, dynamic Love numbers yield eigenperiods identical with the conventional direct integration methods. **We therefore insist on the physical necessity of dynamic Love numbers for the formulation of the problem, and the correctness of all our numerical results.**

References

- Crossley, D. J., M. G. Rochester and Z. R. Peng, Slichter modes and Love numbers, *Geophys. Res. Lett.*, **19**, 1679-1682, 1992.
Rochester, M. G., and Z. R. Peng, The Slichter modes of the rotating Earth: a test of the subseismic approximation, submitted to *Geophys. J. Int.*, 1992.

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The rest of our paper is entirely unaffected by this minor correction.

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