

DEPARTMENT OF EARTH AND PLANETARY SCIENCES

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

CAMBRIDGE, MASSACHUSETTS 02139

Subject : Elastic Properties of Olivine: A Critical Look at  
the Geophysical Literature

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A perusal of geophysical literature concerning the elasticity of olivine and the constitution of the earth's mantle reveals a widespread range of the elastic properties of this material. The attached figure is a summary of all the literature data to date on the shear modulus  $\mu$  and the adiabatic bulk modulus  $K_s$  of olivine. Explanation of symbols used and reference to each datum point is herewith enclosed for your information.

Clearly shown is the fact that the state-of-the art report on the elasticity of olivine (an important mineral in geophysics) is undergoing a severe revision. Any further use of "old" data should be discouraged in the realistic discussion of the earth's mantle. All the earlier discussions relating the old elasticity data to the earth should be re-examined before being accepted.

Those data within the shaded area are still good, and they should have important applications to geophysics.

I hope this memorandum becomes of some use to you and your work related to "olivine" and discussion on the earth's mantle.