Seber, D., Barazangi, M., Ibenbrahim, A., and Demnati, A., *Geophysical evidence for lithospheric delamination beneath the Alboran Sea and Rif-Betic mountains*. Nature, 379, 785-790, 1996.

Abstract:

Geophysical evidence is presented for an episode of active delamination of a piece of continental lithosphere. Observations of earthquake hypocentre locations, seismic wave velocities and attenuation, Bouguer gravity, seismic reflection, and drill hole data are combined with surface geology to infer the presence of a high-velocity, seismically active, rigid body in the upper mantle beneath the Alboran Sea and surrounding Betic and Rif mountain belts of the western Mediterranean region. This upper-mantle body, inferred to be the delaminating continental lithosphere, is overlain by a low-velocity, aseismic and strongly attenuating uppermost mantle, inferred to be the asthenospheric material replacing the delaminating lithosphere.

Figure 5. (a) Interpreted geological cross section between the Rif and Betics. This north-south oriented cross-section represents the inferred structures as well as topographic and gravity profiles along 5°W longitude. Seismicity shown (circles with standard errors) is between 2° and 6°W longitude. Continental lithosphere beneath both the Rif and Betics are delaminating. Base of the lithosphere in each region is not well constrained. As the lithosphere peels off from the overlying crust, low-velocity, low-Q asthenospheric material rises up and replaces the lithosphere, especially beneath the Alboran and Rif regions. Also shown are velocity variations (in percent) obtained by teleseismic tomography. (b) Schematic representation of the evolution of the lithosphere in the Alboran Sea area.