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The thickness of the European Lithosphere as seen by S receiver functions

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The thickness of mobile lithospheric plates is still a important question in debate. Unfortunately high-resolution observations are rarely available. There are indications for thicknesses of continental lithosphere up to 200 km. Some authors assume that the roots of old cratons may reach 400 km. Generally, if the base of the lithosphere âEUR“ the lithosphere-asthenosphere boundary (LAB) âEUR“ would be a more or less sharp transition, then this seismic discontinuity should be observable studying converted phases. The problem of the Ps receiver function method is that multiple converted phases from the Moho discontinuity mask the time interval of the possible arrivals from the LAB. Recently, the S receiver function method became a useful tool to map the seismic lithosphere because primary and multiple conversion are separated in time. In this study we present results from S receiver function analyses of data from more than 80 permanent broadband stations in Central and Eastern Europe. The amount of data from different stations vary significantly depending on the period of registration. Some stations are in operation for more than 20 years as in the case of the stations of the Graefenberg array. For the stations of the Graefenberg array more than 1050 events could be used for Sp analyses (epicentral distance of 60Â° to 85 Â°) and about 1400 events for SKSp analyses (epicentral distance of 85Â° to 120Â°). Using S receiver function method clear converted positive phases could be observed, which might stem from the Moho, the 410 and 660 km discontinuities. A clear coherent negative signal following the Moho phase can most probably be interpreted as the conversion at the LAB. Notable variations of the arrival times of LAB phase suggest important differences in the lithospheric thickness beneath the whole study area. The results of lithospheric thickness obtained from this study mostly support previous assumptions on lithospheric thickness derived from surface wave studies, magneto-

telluric investigations and the analyses of P residuals.