SUPPLEMENT

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The tectonic subsidence evolution of the southern part of the East Barents sedimentary basin

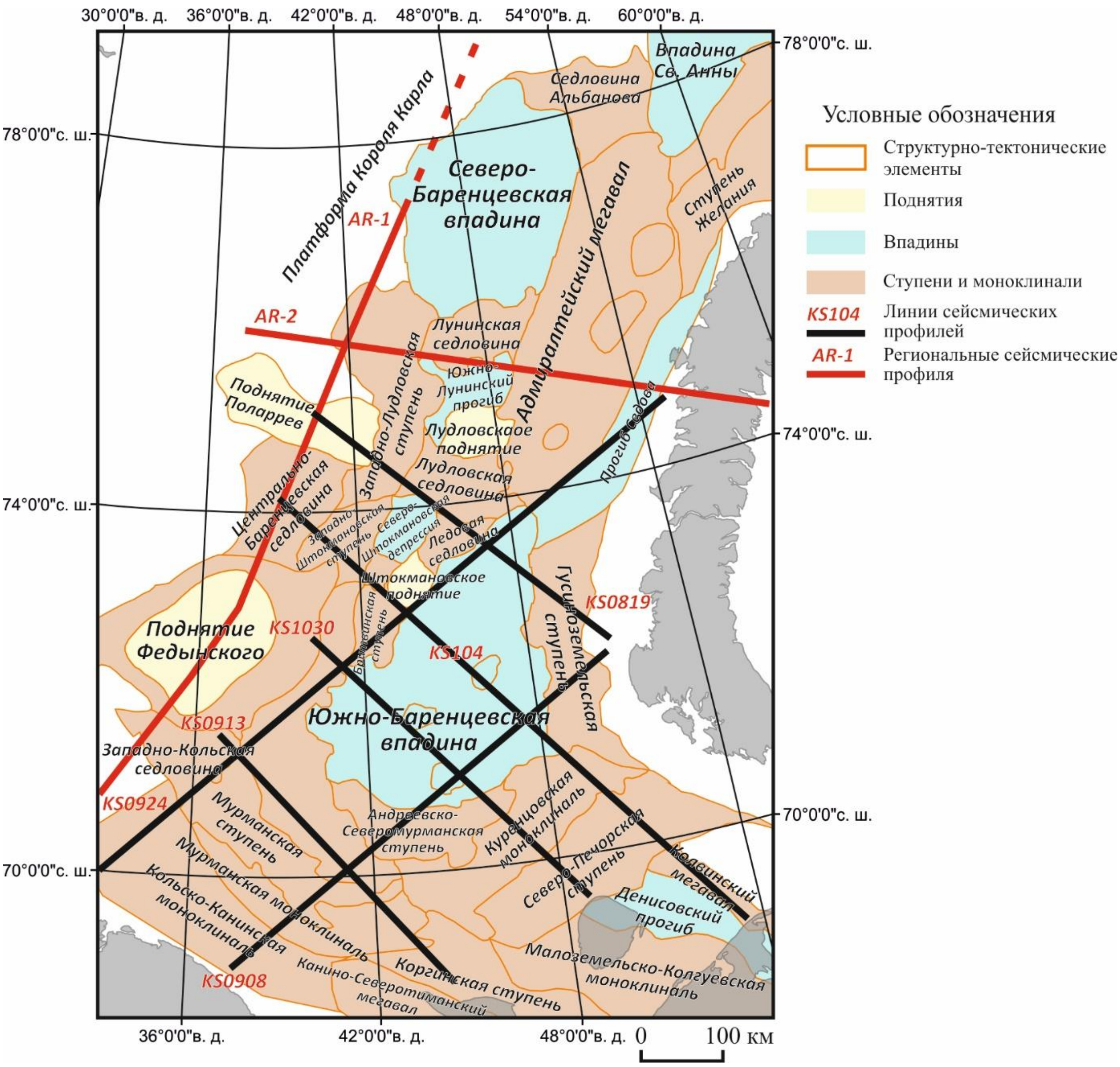

Fig. 1. Tectonic scheme of the East Barents sedimentary basin (based on the materials of N. N. Sobolev and employees of the FSBI «VSEGEI»)

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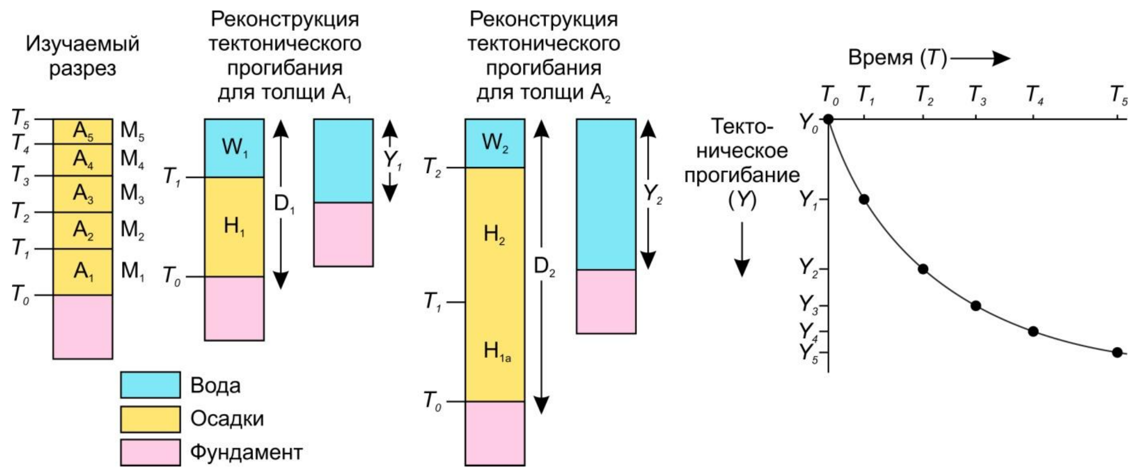

Fig. 2. The sequence of procedures in the calculation of tectonic subsidence (Bond and Kominz, 1984, modified). See text for discussion.

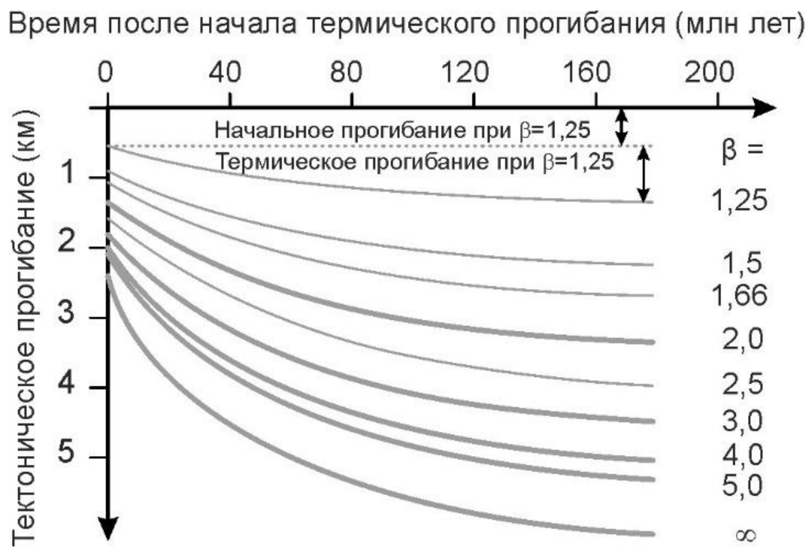

Fig. 3. The theoretical time – tectonic subsidence curves calculated for the McKenzie model of uniform stretching of the crust (McKenzie, 1978). The stretching factor (β) value indicates stretching of the lithosphere. Approximately 40% of subsidence is related to rifting (initial subsidence) and 60% of the following subsidence due to the lithosphere cooling (thermal subsidence) (Bond and Kominz, 1984; Bond et al., 1995, modified).

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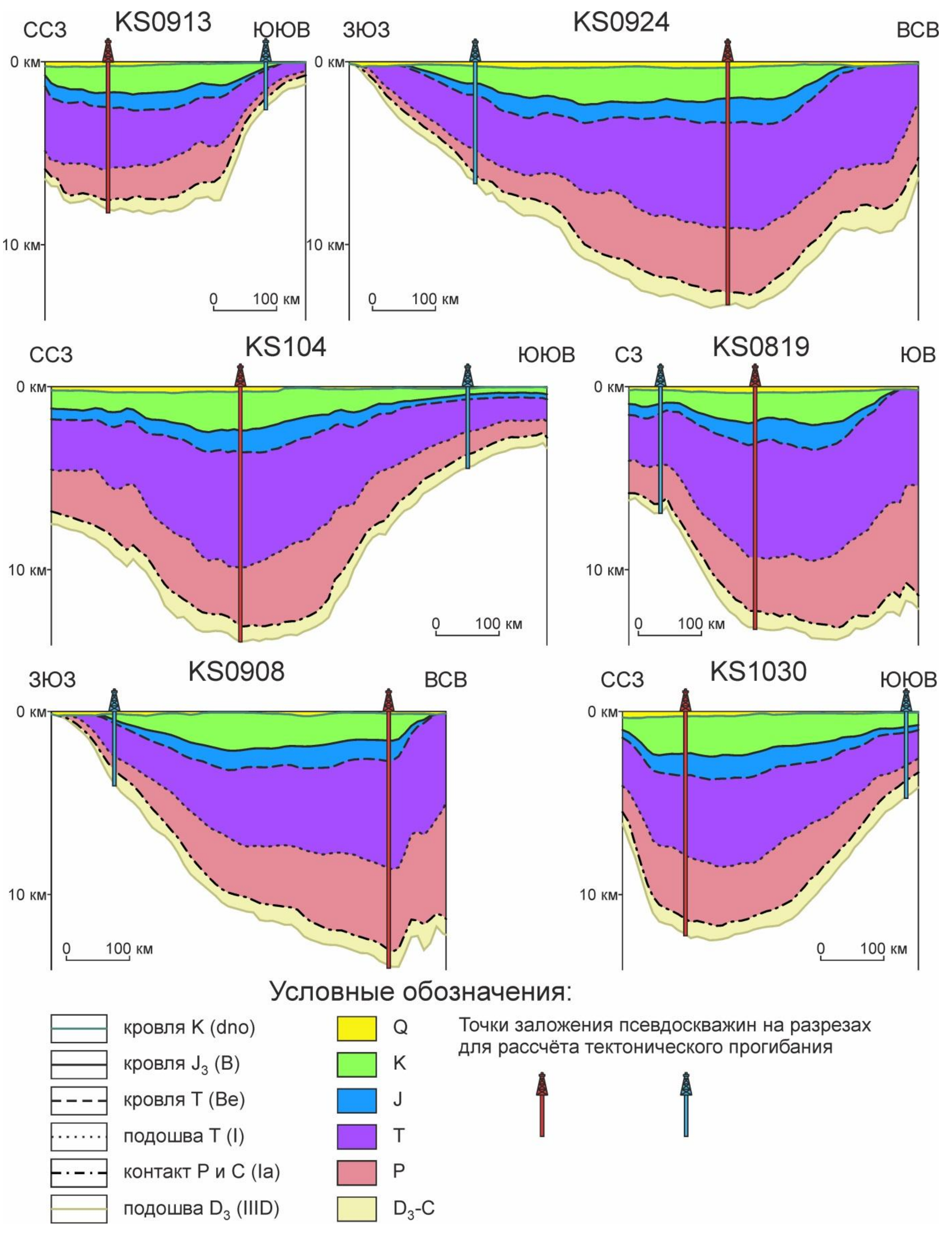

Fig. 4. Regional seismic profiles; vertical lines show the location of pseudo-wells, which were used to calculate tectonic subsidence (red — in the deepest part of the basin, blue — on the margins of the basin). Profiles location is shown on the Fig. 1. Names of seismic horizons shown in brackets.

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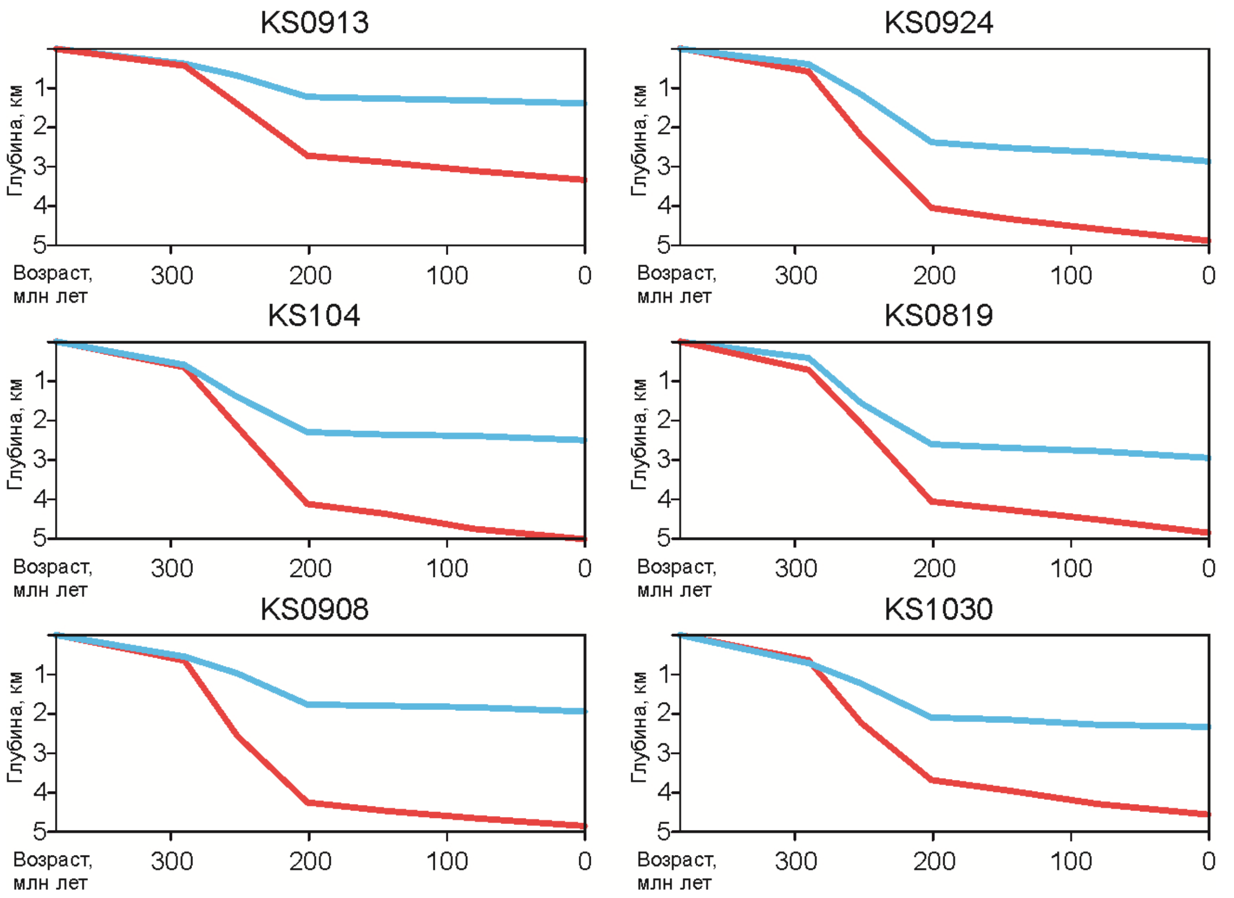

Fig. 5. The tectonic subsidence curves calculated in TecMod for 6 studied profiles. For each profile, the red line shows the tectonic subsidence calculated for the pseudo-well in the deepest part of the basin, the blue one for the pseudo-well at the margins of the basin. The location of the pseudo-wells is shown in fig. 4.

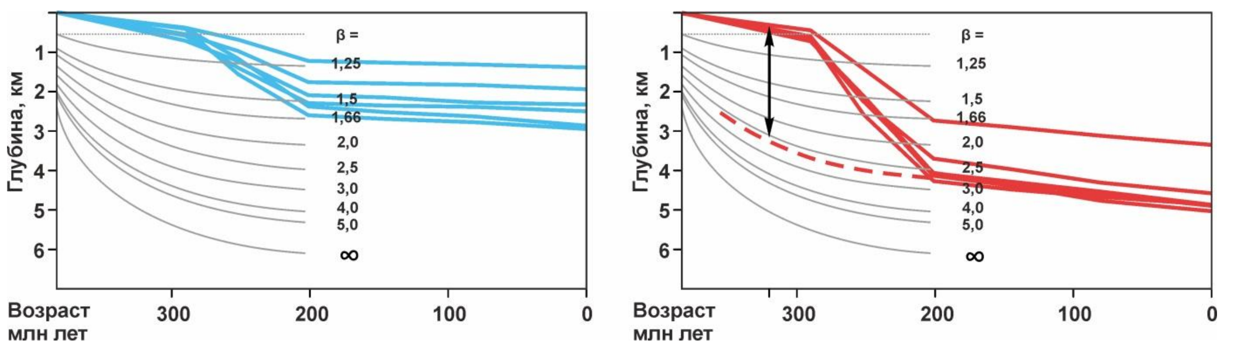

Fig. 6. Determination of the lithosphere stretching factor (β) using the McKenzie model (McKenzie, 1978) for pseudo-wells at the margins of the basin (blue lines) and in the central part (red lines) of the sedimentary basin in accordance with data presented in Fig. 5.
Red dashed line is suggested shape of the tectonic subsidence curve of four closely located curves in the right part of the figure for ages less than 200 Ma.
Black line with arrows shows difference between theoretical and calculated tectonic subsidence curves showing most likely approximate water depth.

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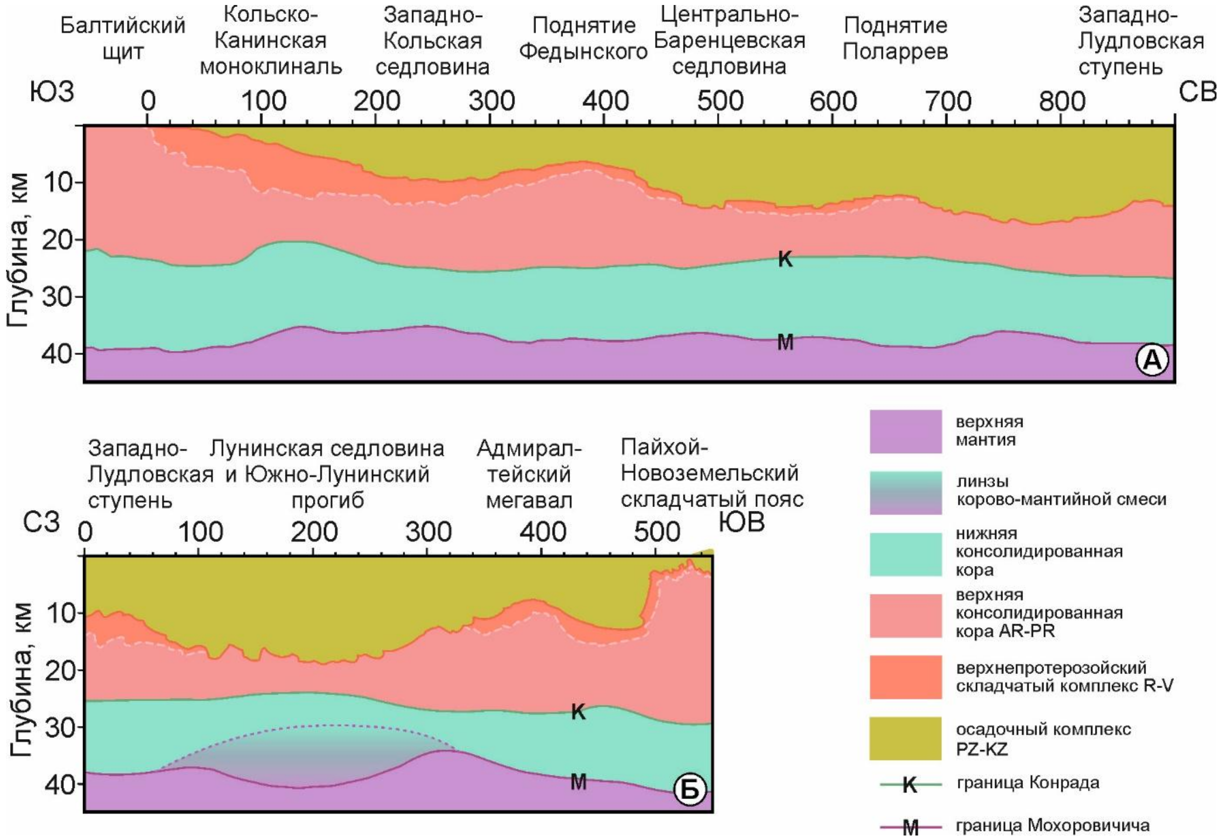

Fig. 7. Variations in the thickness of the sediments of the upper and lower crust along the AP-1 (a) and AP-2 (b) seismic profiles. After Ivanova et al. (2011), simplified. Names of the structures are in accordance with the tectonic scheme in Fig. 1.