We study in details the Earth matter effects on the boron neutrinos from the Sun using recently developed 3D models of the Earth. The models have a number of new features of the density profiles, in particular, substantial deviation from spherical symmetry. In this connection we further elaborate on relevant aspects of oscillations (ϵ 2 corrections, adiabaticity violation, entanglement, {\it etc.}) and the attenuation effect. The night excesses of the ν e $-$ and ν N $-$ events and the Day-Night asymmetries, A N D , are presented in terms of the matter potential and the generalized energy resolution functions. The energy dependences of the cross-section and the flux improve the resolution, and consequently, sensitivity to remote structures of the profiles. The nadir angle (η) dependences of A N D are computed for future detectors DUNE, THEIA, Hyper-Kamiokande and MICA at the South pole. Perspectives of the oscillation tomography of the Earth with the boron neutrinos are discussed. Next generation of detectors will establish the integrated day-night asymmetry with high confidence level. They can give some indications of the η $-$ dependence of the effect, but will discriminate among different models at most at the
(1 $-$ 2) σ level. For the high level discrimination, the MICA-scale experiments are needed. MICA can detect the ice-soil borders and perform unique tomography of Antarctica.