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Imbricated Channel Systems in the Molasse Foreland Thrust Belt: The Effect of Lateral Orogenic Float of the Eastern Alps

The Molasse foreland thrust belt of the Eastern Alps was formed during Oligocene to Miocene post-collisional shortening between the Adriatic and European plates. The shortening was compensated by foreland imbrication during Oligocene times. The geometry of the foreland imbricates was controlled by precollisional basement structures. Miocene lateral extrusion of the Eastern Alps, caused lateral ENE wedging of the upper plate. The NW directed foreland imbricates were overprinted by NE directed compression, displaced along strike and refolded. Balancing of the upper plate shortening by horizontal retrodeformation of lateral escaping and extruding wedges of the Eastern Alps enables an evaluation of the total post-collisional deformation of the hangingwall plate. Quantification of the north-south shortening and east-west extension of the upper plate is derived from displacement data of major faults which dissect the Austroalpine wedges. The foreland imbricates between the hangingwall and footwall plates compensated a part of the lateral orogenic float of the Eastern Alps. Large parts of the imbricates and the autochthonous sequences of the Molasse basin were covered by 3-D seismic surveys which enabled visualization of the complex structures and quantification of shortening. Two hydrocarbon systems evolved in this complex tectonic setting: crude was migrated along regional fault systems into Jurassic, Cretaceous and Eocene reservoir rocks of the autochthonous foreland and bacterial gas migrated into Oligocene and Miocene reservoir rocks. Meandering axial channel systems evolved in conjunction with frontal thrusting onto the Molasse foreland basin and form major gas reservoirs. The deeper channel systems of the eastern part of the basin are partly imbricated.