pression. This phase is characterized by SSE-vergent thrusting of the competent blocks with folding of the gypsum, forming an uplifted, imbricated structure. The area took up a geographically high position as younger sediments are missing up to the Pannonian and these lie on an irregular sedimentation surface.

The Upper Pannonian lignite-bearing formation is unaffected by the evaporite tectonics, though its layers show slight bending above the gypsum diapir due to later extensions. In a cm-scale view, this bending is realized by several microfaults. This subsidence can be derived either from solution processes or the slow ductile flow of the gypsum towards the Nagy Valley.

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Active Faults in Poland: An Overview

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Seismotectonic faults in Poland have developed in Neogene and Quaternary times due to reactivation of Laramian or older structures, or in the Quaternary due to reactivation of Neogene faults. The first group includes, i.a., faults bordering the lower Vistula River valley near Gniew (northern Poland), the escarpment zone of the Gorajec Roztocze region (south-eastern Poland), and many fault zones in the Sudetes and Fore-Sudetic Block (south-western Poland) of throws ranging from 100 m (Legnica - Chojnów fault), through 600 m (Paczków and Kedzierzyn grabens), to 800 m (Roztoka – Mokrzeszów graben). In NE Poland, manifestations of Quaternary reactivation of the Teisseyre-Tornquist zone and of faults perpendicular to it have been encountered. Most of these faults coincide well with the photolineaments identified on satellite images and topolineaments on digital evelation models.

The second group of faults includes those of Lower Silesia (Wroclaw–Ozimek, Przeworno–Wegliniec, Sudetic Marginal Fault, along the northern margin of the Karkonosze Mts.) and Upper Silesia regions, the NW-SE, N-S, NE-SW, E-W and ESE-WNW-orientated faults of the Lublin Upland and Roztocze region (SE Poland), the NNE-SSW and NE-SW-orientated faults in the northern part of the Carpathian Foredeep, as well as several oblique-slip, strike-slip, and thrust faults in the Carpathians (Ruzbachy fault, Bialka Tarzanska valley, faults cutting the middle part of the Dunajec drainage basin, Jelesnia Basin, Tarnów – Pilzno fault, southern part of the Jaslo – Sanok Depression, Dynów Foothills).

The size of throw of Quaternary faults changes from 40 to 50 m and >100 m in the Sudetes and the Lublin Upland, to several – several tens of metres in the Carpathians. The average rate of faulting during Quaternary times has been 0.02 to 0.05 mm/yr, what enables one to include these structures into the domains of inactive (D) or low-activity (C) faults. A similar conclusion can be drawn from the results of repeated precise levellings and GPS campaigns.

Strike-slip displacements have been postulated on some of these faults, including the Sudetic Marginal Fault (SW Poland) or Janowice fault (Lublin Upland). Isolated faults in Central Poland have shown middle Quaternary thrusting of the order of 40–50 m, and some of the Outer Carpathian overthrusts tend to reveal young Quaternary activity, as indicated, i.a., by concentrations of fractured pebbles within the thrust zones.

Episodes of increased intensity of faulting took place in the early Quaternary, in the Mazovian (Holsteinian) Interglacial, and during or shortly after the Odranian (Drenthe) glacial stage. Some of the faults have also been active in Holocene times (Karkonosze Mts., Roztocze region, Podhale Basin, Beskid Sadecki Mts., Jaslo-Sanok Depression).

The Quaternary faulting is reflected in increased thicknesses of young deposits on downthrown blocks (including stacks of colluvial-solifluction wedges), deformation of river terraces and alluvial fans, changes in the drainage pattern, as well as in the formation of cracks within Pleistocene icesheets, controlling the preferred orientation of glaciofluvial landforms.

The seismic activity is often related to strike-slip faults, which in the Carpathians trend ENE-WSW and NE-SW, whereas outside the Carpathians they are orientated parallel to the margin of the Easteuropean Platform and the Sudetic Marginal Fault.