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Commentary Article

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Low-Density Zones in The Crystalline Crust of Transcarpathian Depression from Petrophysical Thermobaric Modelling

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Introduction

The interdisciplinary interpretation of geophysical data is that the event of a coherent model for the Earth's lithosphere wave and gravity fields. Petrophysical thermobaric modelling (PTBM)of the crystalline crust on the demonstrated that characteristics of low velocity zones (LVZs) depend slightly on mineral composition of rocks at relevant depths. they're mainly related to the geothermal regimes of the crystalline crust. Complex changes are experimentally obtained for in rocks. They arise only gradient exceeds the certain threshold within the crust and therefore the pressure which cannot compensate thermal disturbances of rocks.

Description

Rocks and minerals under different PT-conditions disclosed a rise in relative deformation of grains and their twinning within the LVZs (5-15 km depth). The density of rocks increases inside the blocks of dislocations and reduces on intergrain boundaries. The defects of minerals packing increase. The intergrain boundaries expand thanks to their monetization, the quantity of main micro fissures increases. there's depressurizing or opening of the gas-liquid inclusions in minerals in heating due to excess inner pressure. Moreover, the rocks are characterized by the lowered density Information on changes density vs. depth was obtained from studies of the quantity decrement under PT-experiments and therefore the ultrasonic determinations of the compressibility of the rocks. The rarity is extremely sensitive to the temperature conditions of the crust similarly to the LVZs. Increasing deep HF decreases rock density, activates capability to decrease the rock density and increase their permeability and hygroscopicity (activates a process of fluid movement) that, for instance, causes metamorphic transformation of rocks. In other words, these LVZs are to be the foremost active horizons of present-day geological-geophysical transformations of the crystalline crust mineral environment.

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MT and GDS measurements were appropriated a neighborhood limited to the north by the Rhone and to the South by the Swiss–Italian border. the situation of the sites, the magneto telluric data and therefore the modelling results are often found elsewhere, Thick slab embedded during a resistive, featureless rock matrix. The slab plunges within the SSE direction below Alps with a mean dip of 35° and follows the form of the Alpine arc. With a complete length of 20 km, its lower tip reaches a depth of 8 km. At its NNW edge, it crops out at the surface within the middle of the Houillère Zone. Comparison with existing seismic profiles shows excellent agreement between the slope of the conducting feature within the MT model and therefore the seismic reflectors. The plunging, very conducting layer are often interpreted because the southward continuation.

Conclusion

The lithosphere-scale 3-D structural/density model of the LVCM, including adjacent continental and oceanic domains, are successfully constructed. The obtained 3-D model summarizes our current knowledge about both the sedimentary cover and therefore the crystalline crust of the study area, showing that the highest of the crystalline basement is deeply located within the Basin. The Platform is characterized by moderate depths to the basement, and therefore the margin features a generally uplifted basement.

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