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ORGANIC MATTER AND CLAY MINERALS AS INDICATORS OF THERMAL HISTORY IN THE TRANSCARPATHIAN DEPRESSION (EAST SLOVAKIAN NEOGENE BASIN) AND THE VIENNA BASIN

(7 Figs.)

Abstract: Analytical characteristics of organic matter and clay minerals reveal striking differences in the rate of diagenesis and catagenesis of the Neogene rocks in two basins with high and low geothermal gradients. In the "hot" Transcarpathian depression the zone of main liquid hydrocarbon generation and smectite dehydration is relatively thin and shallow at depth from 1.7-2 km to 3-3.5 km. In the "cold" Vienna basin such a zone occurs below 3.5 km and its floor probably is not reached even in the deepest Neogene rocks at depth of 5.5 km. The organic and clay characteristics which mark the diagenetic and catagenetic stages show good relationship with subsurface temperature.

Резюме: По анализам органического вещества и глинистых минералов является, что скорость диагенетических и катагенетических процессов в неогеновых осадках резко отличается в зависимости от глубины в Закарпатской впадине (Восточнославянском бассейне) и Венском бассейне. В Закарпатской впадине с высоким геотермическим градиентом главная зона образования жидких углеводородов и зона дегидратации смектита находится в относительно неглубоком и узком интервале с 1,7-2 до 3-3,5 км. В "холодном" Венском бассейне происходят эти процессы более медленно с началом на глубине более 3,5 км.

Key words: organic matter, clay minerals, thermal history, Transcarpathian depression, Vienna basin.

Introduction

Organic matter and clay minerals undergo well measurable physical and chemical changes during postdepositional evolution of sedimentary rocks. Some of their characteristics are used as indicators of the degree of diagenetic and catagenetic alteration and of the thermal history of the sedimentary strata.

Vitrimite reflectance, Rock-Eval pyrolytic data and illite-smectite expandability are used in this study of catagenetic zonality. Earlier geochemical data and thermal models of hydrocarbon generation in the Transcarpathian depression (East Slovakian basin) are included (Francú, 1986, 1987; Francú - Šimánek, 1987; Francú - Milička, 1988; Francú et al., 1989) together with those concerning the Vienna basin (Müller, 1987; Müller - Chmelík, 1987). This paper presents a comparison of the different catagenetic rate in the course of burial and thermal history and to show the different prospects of hydrocarbon generation in these two basins with very different geothermal conditions.

Geological setting

The Transcarpathian depression (often called the East Slovakian Neogene basin on the Czechoslovak territory) and the Vienna basin are the intramountain depressions of the

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