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Hydrocarbon Formation in the Subduction Zones of the Thrust Belts

Relationship between the oil- and gas-bearing basins of the World, submountane troughs and foredeeps is well known.

The process of subduction enables to explain the mechanism of formation of foredeeps, regional thrusts (abduction), and geosyncline folding. They are caused by collision of lithospheric plates. Subducting plates transfer down great amounts of sediments containing hydrocarbons formed in passive margins.

Large accumulations of oil and gas are originated within foredeeps formed when island arc thrusts over passive margins of continents of the Atlantic type.

The process of collision between island arcs and old continental margins in the Apalachee and Urals was fully completed 350 and 250 Ma ago. This process was developed about 100 Ma ago in the Rocky Mountains, about 80 Ma ago in the Cis-Verkhoyansk Depression, and about 20 Ma ago in the Persian Gulf.

Colossal amounts of sediments from continental slopes and shelves get to the subduction zones in the process of thrusting of island arcs on continental margins. Warping of continental margin accelerates under weight of thrusting island arc. Crustal waters and hydrocarbons squeeze through sediments located under island arc.

Though the majority of hydrocarbons is discharged and lost within the island arc noticeable amount could migrate from under arc towards the margin of continent on which island arc thrusts or even behind volcanic front of arc. They seep through wide gaps between narrow volcanic channels (the Rocky Mountains and the Andian Belt are examples). Thickness of the considered source of hydrocarbons is very big.