Structural, molecular and isotopic composition of organic fossils and their relationship to modern counterparts

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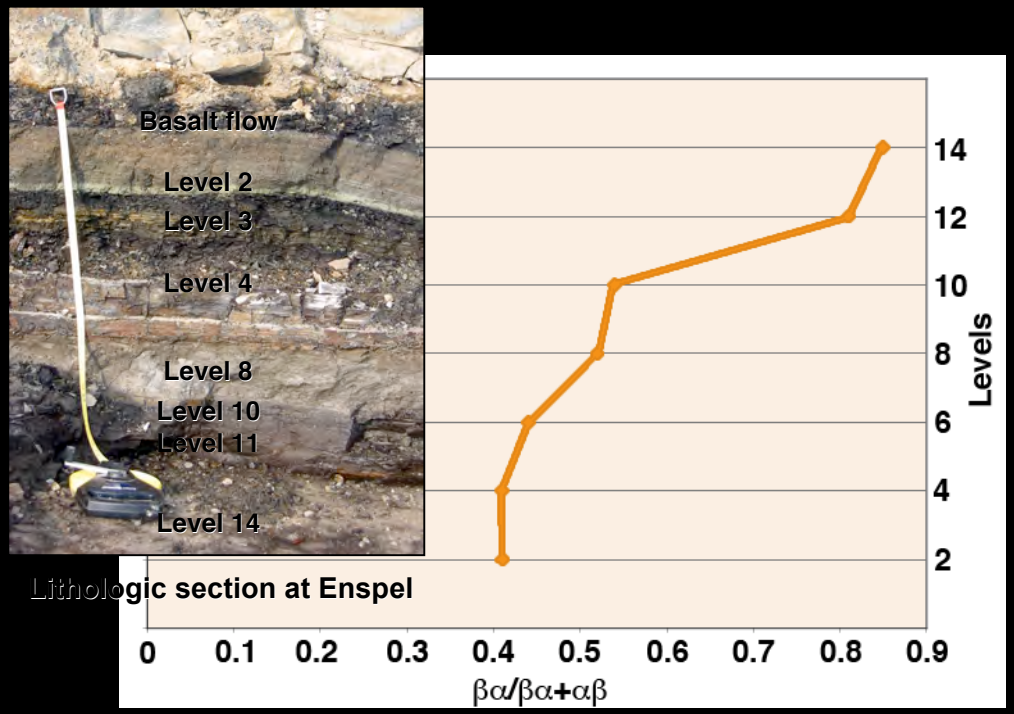
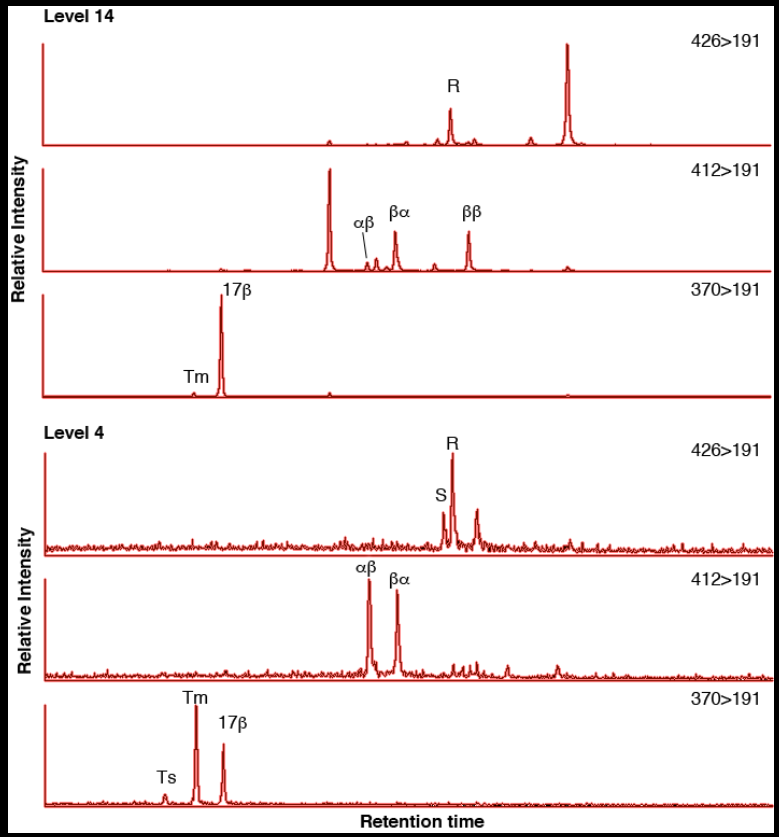
Thermal alteration of organic matter in the Enspel Formation (Oligocene, Germany) generated by a basalt flow

17β, 21α (H) moretanes are thermally less stable than 17α 21β (H) hopanes and the abundance of moretanes (calculated for C29 and C30 homologues) decreases relative to that of hopanes with maturity. The biological 17β, 21β (H) stereochemical configuration of hopanoids is unstable. ββ hopanes readily convert to βα (moretanes) and αβ hopane configurations. Variation of the ratio βα/βα+αβ in the levels in the Enspel section is a response to thermal stress from the overlying basalt flow. Note that the ratio decreases from Level 14 to Level 2 with proximity to the flow.



Distribution of moretanes and hopanes through the Enspel section



MRM-GC-MS chromatograms of important hopane biomarkers for which maturity parameters were calculated from Level 14 (furthest from the basalt flow) and Level 4 (closer to it).
Note the absence of the biological ββ isomer in Level 4 close to the flow and the absence of the thermally stable Ts molecule in Level 14 away from the influence of heat.