PALAEOBATHYMETRICAL AND PALAEOECOLOGICAL DEVELOPMENT IN THE VIENNA BASIN (AUSTRIA) DURING THE EARLY AND MIDDLE MIOCENE

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The Vienna Basin (VB) originated during the early Miocene and represents one of the largest onshore oil and gas field in Europe. The VB is composed of several horst and graben structures forming different subbasins, each with its own geodynamic evolution and deviating palaeobathymetric and palaeoenvironmental developments during the Miocene. We present an analysis of water depth evolution including changing palaeoecological trends along a NE-SW transect based on analyses of benthic and planktonic foraminifers of hundreds of samples derived of 52 drillings. We document dramatic changes in the depth profile through time, which coincide with shifts of prevailing tectonic regimes. Bathyal conditions were established during the early Miocene piggy-back stage and the early middle Miocene extensional phase. A clear shallowing trend from upper bathyal to inner neritic conditions occurred during the middle Miocene extensional tectonic phase. Further, our analyses comprise reconstructions of sea surface temperature (SST), bottom water temperature (BWT), salinity, trophic levels, stress indicators, mode of life, feeding preferences and diversity indices (Fisher α, dominance and equitability). Bottom water temperatures indicate a cooling during the early and middle Badenian (Langhian), which seemingly contradicts the global warming of the Middle Miocene Climatic Optimum (MMCO) and a subsequent warming, which contrasts the expected trend following the cooling of the Middle Miocene Climatic Transition. Both trends are discussed as result from bathymetric evolution of the VB and intense upwelling during the early and middle Badenian. All lowstand systems of relative sea level in the VB coincide with global Mi-events. The observed maxima of the relative sea level in the VB are vaguely in phase with the global record from the Ottnangian (late early Miocene) to the middle Badenian (middle Miocene) but exceed the range of global sea level rise by three to four times, suggesting a strong tectonic amplification.