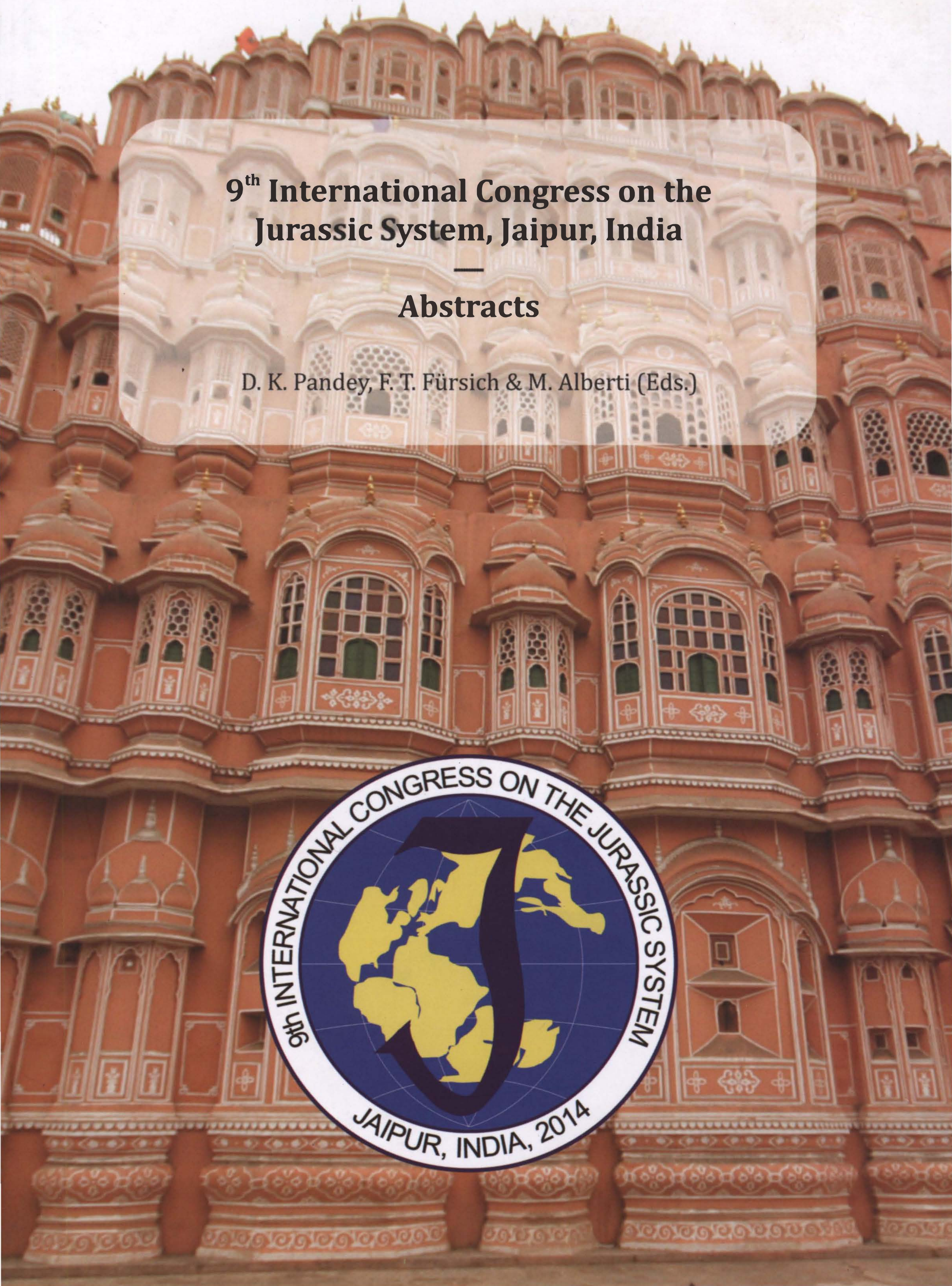

9th International Congress on the Jurassic System, Jaipur, India

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Abstracts

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Abstracts

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Continental drainage and oceanic circulation during the Jurassic inferred from the Nd isotope composition of biogenic phosphates and sediments

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The Jurassic period marked the onset of Pangean dislocation that led to our modern geography. The initiation of this major continental reorganisation involved numerous geodynamic processes whose timing, interaction and feedback had important paleoclimatic and geochemical consequences. Among them, the opening of the northern Atlantic Ocean and the development of transcontinental seaways across the Laurasian and Gondwanan cratons caused major modifications to global oceanic circulation which significantly affected heat and moisture transport (Donnadieu et al. 2006). At the same time, the incipient growth of the Pacific plate triggered increases in plate subduction rates, terrane accretion, and volcanism all around the Panthalassan ocean (Bartolini & Larson 2001). Similarly, many subduction and accretion events occurred in other domains, leading to progressive closures of the Paleotethyan and Mongol-Okhotsk oceans. This global reorganisation of both continental masses and oceanic circulation patterns likely affected the Jurassic climate by shifting the climatic belts, changing albedo, and modulating atmospheric $p\mathrm{CO}_2$ through volcanic degassing or changes in silicate weathering rates (Dera et al. 2011).

In this study, we attempt to better constrain oceanic connections as well as the modifications in continental drainage that resulted from the Jurassic paleogeographic reorganisation. For this purpose, we present 53 new neodymium isotope values (noted $\varepsilon \mathrm{Nd}_{(t)}$) measured on fossil fish teeth, ichthyosaur bones, phosphate ooids, and sediments from Europe, European Russia, and North America. Application of this geochemical proxy is based on the principle that rocks weathered on continents have different Nd isotope compositions according to their origin (volcanic vs. cratonic) and age (Precambrian to recent). Through fluvial discharge, seawater acquires its εNd signal (recorded by phosphate during early diagenesis) reflecting all potential sources in the drainage area (Tachikawa et al. 2003). As the Nd residence time is relatively short compared with the global oceanic mixing rate, this geochemical proxy is deemed conservative and very suitable for tracking exchanges of water masses with different isotopic signatures (Martin & Scher 2004). For example, Stille et al. (1996) showed that during the Triassic period, Panthalassan and Tethyan ocean waters were very radiogenic