

manganese content and the cathodoluminescence characteristics. The same evolution in the redox potential has been observed in spired syntaxial overgrowths. Intense zonations under cathodoluminescence are present in some syntaxial overgrowths, in rhombohedral calcites and in scalenohedral and blocky calcites.

The analyses of the bulk limestones containing the zoned calcite cements show a high Mn/Fe ratio. This is due to the presence of relatively voluminous zoned cements, which precipitated under slightly reducing (meteoric ?) conditions. The presence of clays and iron oxides in the carbonate rocks lowers the Mn/Fe ratio. Calcites in late diagenetic fractures have a low Mn/Fe ratio.

The Mn/Fe ratio of bulk samples can thus contribute to unravel the diagenetic history of limestones.

TERRESTRIAL SEDIMENTS AND PALEOSOILS FROM THE LOWER DEVONIAN (EMSIAN) IN THE RHENISH MASSIF (W. GERMANY)

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U. Jux (1983) mapped the Upper Bensberger sequence (Emsian) in the Oberbergisches Land (W. Germany) as composed of marginal marine sediments. The present work shows the development of a cyclic set of «fining upwards»-sequences with paleosoils which are overlaid by pyroclastics of the «Hauptkeratophyr (K4)».

The sedimentological parameters of current energy, sedimentation mode, water level, incomplete sedimentation, several paleosoils and the fossil record all point to terrestrial sedimentation.

Within the paleosoils, two types of soils could be distinguished:

1. Hydromorphic soils (sensu Remy, 1980). The groundwater table remains longer almost at the same level as the soil surface. Increasing insolation forms mud cracks when the groundwater table falls. According to Remy (1980), they are allochthonous soils, formed seasonally after floods.

Typical plant communities are *Sciadophyton* sp., *Taenio-crada*-like plants, algae and rare *Zosterophylaceae*. A special root-system is found only in this soil-type.

2. Brown-yellow muddy-silty soil including many roots are rich in concretions of ironhydroxide and terrestrial invertebrate burrows.

Typical fossils are roots, rhizoms, *Zosterophylaceae* (*Anisophyton gothani*), *Drepanophycus*, *Prototaxites*, algae and carbonised plant fragments (*Pachytheca* and *Prototaxites* fragments).

The Bensberger layers are overlaid by the «Hauptkeratophyr»-ignimbrites. Because of the sedimentological parameters and the laterally marine facies development (in the north and northwest), the depositional environment must have been a lowland at sea-level.

On the basis of the measurements of paleocurrents, it is apparent that the depositional environment lay to the south of the Old Red Continent.

RECENT INVESTIGATIONS OF Pb-Zn MINERALIZATIONS IN SOUTH LIMBURG (NL) AND THE NORTHERN EIFEL

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On the eastern border of the Brabant Massif vein-type Lead-Zinc mineralizations occur in lower carboniferous host rocks of South Limburg. They look very much like the mineralization type of Aachen/Stolberg. Investigations are carried out on drillcores from Valkenburg (Thermae 2002), which consists of paleozoic shales and silicified carbonate host rocks with several occurrences of pyrite, marcasite, sphalerite («Schalenblende»), wurzite, calcite and galena (Friedrich *et al.*, 1987). First microthermometric data show an average homogenisation temperature (Th) of 125°C. Melting temperatures of last ice (Tm) are about -17°C and eutectic temperatures (Te) are ranging between -52 and -45°C. These data from co-genetic quartz indicate an ascendent transport of the H₂O, NaCl and CaCl₂ containing fluids.

In the Aachen/Stolberg Pb-Zn-district some fluid inclusions are measured on co-genetic calcites of drillcores from the Albertsgrube orebody near Stolberg. There are two clusters of homogenisation temperatures with an average of 72°C eg. 157°C. The average melting-temperature of last ice (Tm) amounts to -4°C in the first group and -20°C in the second group. These results point towards a mixing of warmer ascendent fluids with cooler descendent fluids.

Pb-isotopes from both occurrences show a similar distribution and plot into the field, for which Krahn (1988) proposed a postvariscan age. Remobilization from variscan mineralizations is rejected whereas a mobilization of the metals from underlying rocks is expected.

FRIEDRICH, G., BLESS, M.J.M., VOGTMANN, J. & WIECHOWSKI, A., 1987. *Ann. Soc. géol. Belg.*, 110 (1) : 59-75.

KRAHN, L., 1988. *Inst. f. Mineralogie*, RWTH Aachen.

GIVETIAN-FRASNIAN PHYTOGEOGRAPHY OF EURAMERICA AND WESTERN GONDWANA BASED ON MIOSPORE DISTRIBUTION

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The Givetian and Frasnian phytogeography of Western Gondwana and Southern Euramerica, as interpreted from miospore distribution, shows a rather uniform vegetation prevailing from palaeo-polar to palaeo-tropical regions. Similar climatic conditions are certainly required to explain this but it is concluded from a discussion on the dispersal of homosporous vegetation that a wide ocean separating these regions would have prevented it. Frasnian Northern Euramerica vegetation seems different and might correspond to an equatorial belt.

Heckel & Witzke's paleogeographical reconstruction fits much better with the miospore distribution than other maps.