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MIOSPORE CORRELATION BETWEEN NORTH AMERICAN, GERMAN AND URALIAN (UDMURTIA) DEEP FACIES THROUGH APPALACHIAN, IRISH AND BELGIAN PLATFORM AND CONTINENTAL FACIES NEAR THE DEVONIAN/CARBONIFEROUS BOUNDARY

A contribution to Project GLOBAL BIO-EVENTS

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At the Devonian/Carboniferous transition, in a rather short timespan that Conodont workers (Sandberg et al. 1986) estimate shorter than three M.y. (from the Lower expansa to the sulcata zones), six interval zones of miospores are available. Each interval zone is based on the first occurrence of one or a few species in assemblages which are on the Devonian side of the boundary, otherwise very similar (the succession of interval zones VCo/LV/LL/LE/LN). At or very near the D/C boundary, the change in miospore assemblages is, on the contrary, rather sharp in all facies except maybe the continental one's (the succession LN/VI). Palynologists work with tenths of thousands of specimens in each sample. This gives some statistical value to their approach on the first occurrence of species, especially when comparing marine sediments. Therefore the lateral correlations are believed to be reliable.

These lateral correlations show that in North America, Western Europe and Uralian (Udmurtia) areas, cycles of low and high levels of sea were synchronous. They are listed below:

(1) "Pre-expansa"- VCo zones of low sea-level (Three lick Fm, USA; Lower Evieux Fm in Belgium, Clendening et al. 1980).

(2) "expansa" - LV - LL zones of high sea-level (Cleveland Mbr of Ohio Fm in USA, Winslow 1962; Old Head Sandstone in Ireland, Clayton et al. 1986; Etroeungt Fm in Belgium, Becker et al. 1974; Zavolga beds in Udmurtia, Byvsheva et al. 1984).

(3) "praesulcata" - LE - LN zones of low sea-level (Bedford Shales and Berea Sandstone in USA, Eames 1978; Hangenberg Shales in Germany, Higgs & Streel 1984; mudstone part of the Malevka beds in Udmurtia).

(4) "sulcata" - VI zones of high sea-level (Sunbury Shales in USA; Castle Slate Mbr of the Kinsale Fm in Ireland; uppermost Hangenberg Shales and Hangenberg limestone in Germany; limestone part of the Malevka beds in Udmurtia).

The low sea-level (3) is complex: short transgressional movement in the Appalachians, USA (Dennison et al. 1986), very small thickness of rock and structural control in Ireland (Clayton et al. 1986), lack of deposi-

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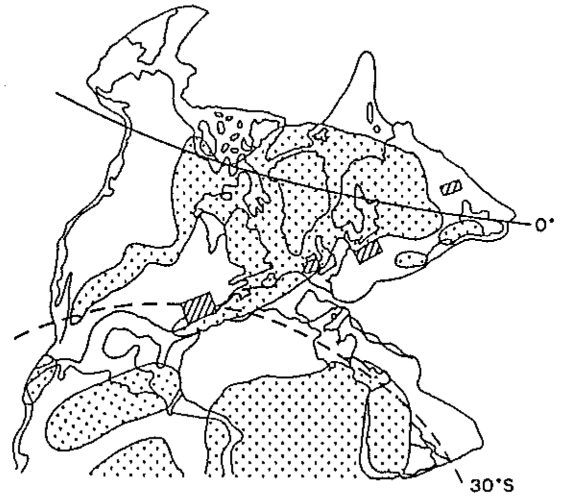

Figure 1. Paleogeographical reconstruction of the Old Red Continent and other land areas (shaded) after Scheckler 1986, Fig. 2; slightly modified. Lined rectangles show studied areas here compared.

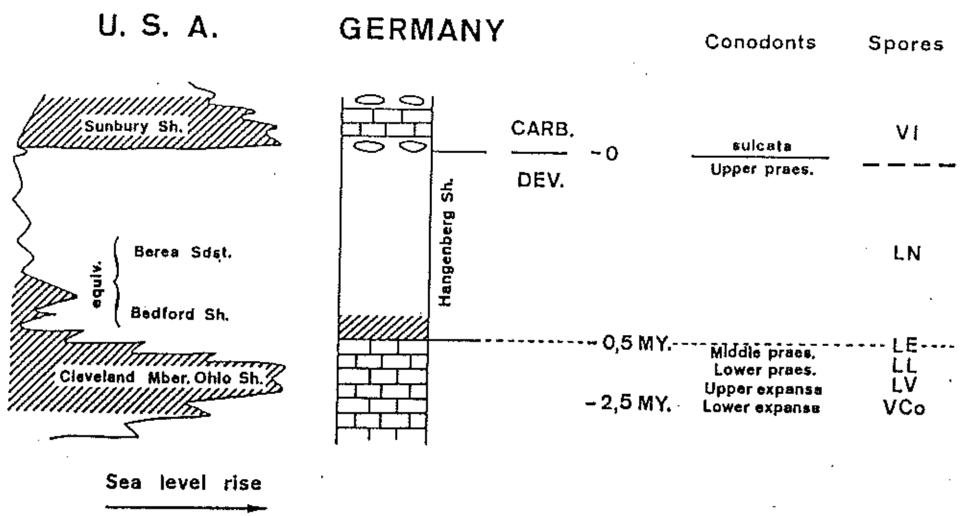

Figure 2. Stratigraphical comparison between America (USA) and Western Europe (Germany) near the Devonian/Carboniferous limit. Conodonts and time after Sandberg et al. 1986. Lined areas are dominant black shales.

tion or erosion between the Etroeungt Limestone and the Hastière Limestone in Belgium (Streel 1986), reworking processes in the Hangenberg Shales of the Oberrödinghausen area in Germany (Higgs & Streel 1984). Obviously the black shales development at the base of the Hangenberg Fm in Germany is local or might, at best (see Fig. 2), correspond to the

short transgressional movement within the Bedford Shale equivalents in USA.

The sharp spore-assemblage change (LN/VI) very near the Devonian/Carboniferous boundary (first Siphonodella sulcata entry) corresponds to the high sea-level (4) of the Sunbury Shale in Eastern USA and of the Castle Slate Mbr of the Kinsale Fm in Ireland. It corresponds to the end of the supply of terrigenous material in deeper facies in Germany and near the Ural. This floral change however has not the same characteristics when one compares the tropical realm of Eastern USA and Western Europe with the equatorial realm at the East of the Russian Platform (see Byvsheva et al. 1984).

Moreover, the floral change is less obvious in the "inland"-continental beds (see the Middle Sandstone and Shale Mbr of the Pocono Fm in Streel & Traverse 1978).

A suggestion is here made that the Devonian/Carboniferous sea-level rise (4) might well have affected the coastal vegetation more drastically than the inland vegetation.

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