Table 1. Table summarizing the statute of international stratotypes of studied boundaries

Boundary	Stratotype	Ratified	Main references	Comments
Lochkovian-Pragian	Homolka quarry near Praha-Velká Chuchle	on the International Geological Congress in Washington, 1989 (CHLUPÁČ – OLIVER 1989)	CHLUPÁČ et al. (1985), CHLUPÁČ - KUKAL (1988), CHLUPÁČ (2000), WEDDIGE (1987)	the first occurrence of conodont *Eognathodus sulcatus sulcatus* in the bed No. 12
Přídolí-Lochkovian	Klonk near Suchomasty	on the 24. International Geological Congress in Montreal, 1972 (MCLAREN 1977)	CHLUPÁČ et al. (1972), CHLUPÁČ – KUKAL (1977), CHLUPÁČ – HLADIL (2000)	the first occurrence of graptolite *Monograptus uniformis* in the bed No. 20
Ludlow-Přídolí	Požáry quarry near Praha-Řeporyje	on the 27. International Geological Congress in Moscow, 1984 (BASSET 1985)	KŘÍŽ et al. (1986), KŘÍŽ (1992), CHLUPÁČ - KUKAL (1988)	the first occurrence of graptolite *Monograptus parultimus* in the bed No. 96

These studies addressed the problems of thermal history, the migration of bituminous material, and the circulation of fluids, by the use of fission-track analysis and other modern methods.

The term "microfacies" was probably first used by BROWN (1943), but only as a synonym for the microscopic composition of rocks. The numerous studies of limestone microfacies carried out from the 1950's–70's introduced a great number of individual microfacies types. CUVILLIER (1952) defined microfacies as "the paleontological and petrographical characteristics of limestones based on thin-section studies". This definition has been further supplemented by FLÜGEL (1982) who defined it as "all paleontological a sedimentological features observable in thin-sections, imprints and polished sections to enlargement 200×".

WILSON'S (1975) idea of 24 standard microfacies (SMF) contributed to the unification of present research efforts. This method was first used in the Czech Republic by ELIÁŠ (1981), who studied Jurassic carbonates in northern Bohemia, the Moravian Karst, and in the vicinity of Brno. Recently, microfacies analysis has been used in the Jurassic limestones of the Silesian nappe unit in the Carpathian flysch (ELIÁŠ – ELIÁŠOVÁ 2001). Some papers deal with the microfacies analysis of the Early Paleozoic rocks of the Barranadian area, such as Hladil's study of the S/D boundary stratotype at Klonk near Suchomasty (HLADIL 1991, 1992). However, WILSON'S (1975) description of SMF was not followed in that paper. VELEBILOVÁ and ŠARF (1996) studied the Lower Devonian limestones of the Prague area, and defined eight microfacies types that could be correlated with classic SMF. A microfacies study of the uppermost Choteč Limestone and the Kačák Member was carried out by BUDIL (1995). A short note on SMF in the Barrandian area was published in KUKAL (1986), while a microfacies analysis of the Middle and Upper Devonian limestones in Moravia was presented by HLADIL (1988, 1994).

3. Microfacies analysis

Sections were sampled for microfacies analysis in the interest of characterizing the main lithological types and lithological boundaries. To this end, about 100 thin sections were examined.

Petrographical characteristics were described based on microscopic studies of the paleontological content, authigenic mineralization (such as dolomitization, silicification), insoluble residues, and the clay and quartz components.

The assignment to individual SMF is based on FOLK'S (1959, 1962) and DUNHAM'S (1962) classifications of carbonate rocks. FOLK'S (1959) classification allows the detailed definition of limestone types not only according to the amount of matrix, cement, and allochems (as is simplified in DUNHAM'S 1962 classification), but also based on the degree of sorting and sediment maturity.

The results of microfacies analysis also allow the character of the depositional environment to be defined, and the reconstruction of the mechanism of origin. In this field, the contribution of studies of sedimentary structures and textures (such as parallel or inclined lamination, positive gradation) is very important.

Only seven of WILSON'S (1975) SMF were identified in the sections studied for this paper, all of which belong to five facies belts (the following description is based on Wilson's definitions and numbering):

SMF 1 – spiculite. A dark, organic rich, and argillaceous lime mudstone or wackestone, siliceous spiculitic calcisiltite. Spicules are usually oriented, generally siliceous monoaxons, commonly replaced by calcite.

SMF 2 – microbioclastic calcisiltite. This is a mixture of fine bioclasts and peloids with a very fine grainstone or packstone texture. Fine ripple cross-lamination is common.

SMF 3 – pelagic lime mudstone. Its micrite matrix contains scattered fine sand or silt grains composed of pelagic microfossils (e. g. radiolarians or globigerinids) or megafauna such as graptolites or thin-walled bivalves.

SMF 5 – bioclastic grainstone or packstone. This is a common reef flank facies composed mainly of organic debris from organisms inhabiting the reef top and flanks. Geopetal fillings and umbrella effects from infiltered finer sediment are common.

SMF 9 – bioclastic wackestone or bioclastic micrite. Almost invariably this sediment contains the fragments of diverse organisms jumbled and homogenized by burrowing. It is formed in quiet water below the normal wave base, and contains preserved infauna and epifauna.

SMF 11 – coated bioclasts in sparite, grainstones. Bioclasts may be micritized. This sediment forms in areas of constant wave action, at or above the wave base so that lime mud is removed.

SMF 12 – coquina, bioclastic grainstone or rudstone, shell

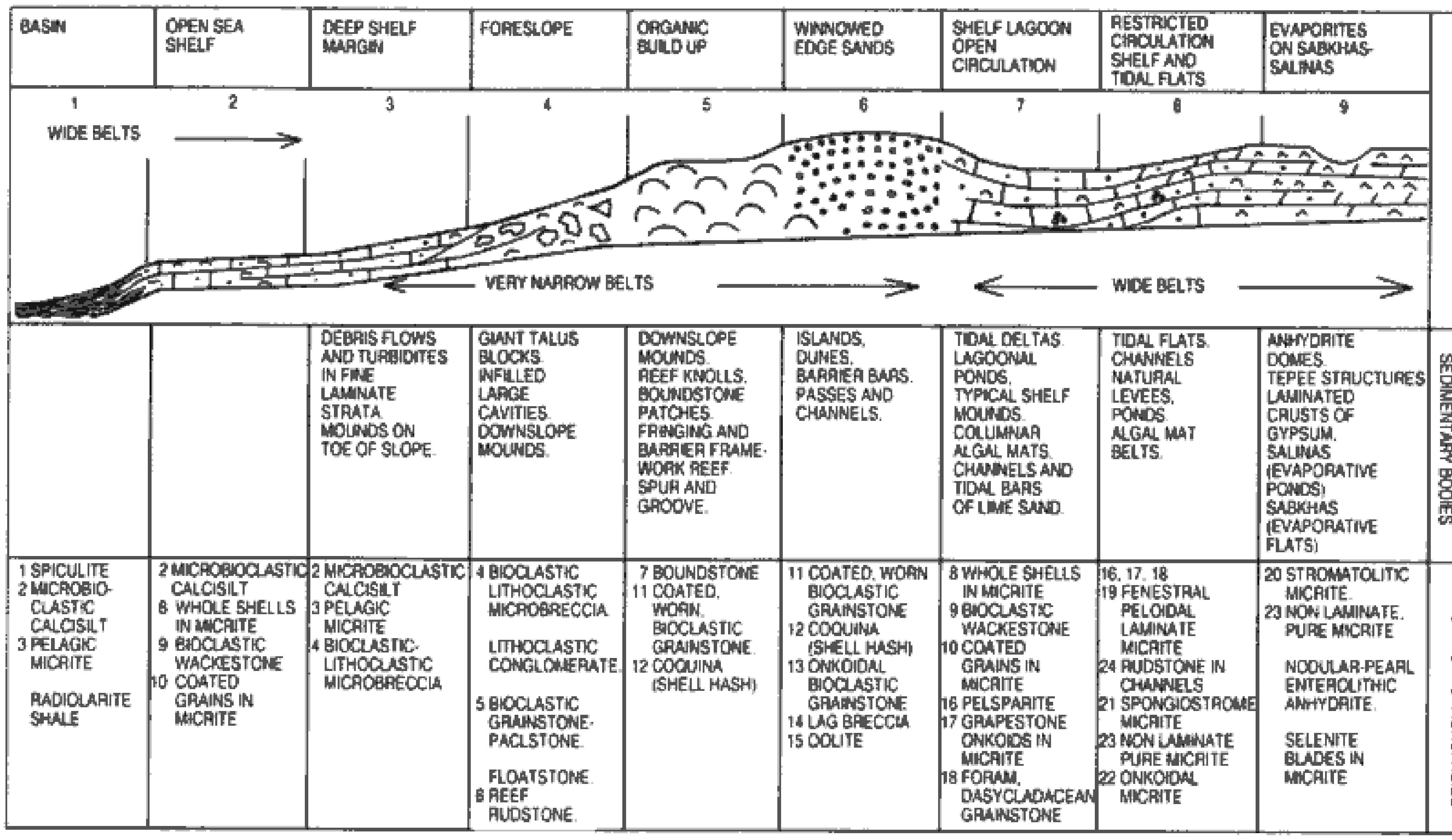

Figure 2. The scheme showing WILSON's (1975) conception of 9 Facies Belts (FB) and the associated 24 Standard Microfacies (SMF).

hash. This sediment is formed in an environment of constant wave or current action, with mud removed by winnowing. The concentrations of specific types of organic debris may be significant. This type of concentration is a common slope and shelf edge sediment.

These microfacies belong to the following facies belts (see fig. 2).

Facies Belt 1. Basin
Deep sea environment 1) in geosynclinal troughs with continuously and rapidly deposited turbidites, or 2) quiet deep water cratonic basins with slow sedimentation and intermittent debris flows. Prevailing rock types: radiolarites, dark micritic limestones with interbedded shale.

Facies Belt 2. Open sea shelf
Water depth ranges from tens to hundreds of metres, generally oxygenated and of normal marine salinity, with good current circulation. The depth is sufficient to be below normal wave base, though intermittent storms can affect bottom sediments. Fossiliferous limestones (wackestones) interbedded with marl prevail.

Facies Belt 3. Basin margin or deep shelf margin
Water depths of tens to a few hundreds of metres, generally below wave base and barely at oxygen level. Formed at the toe of a carbonate-producing shelf, from material derived from the shelf. Fine-grained limestone (mudstones and calcisiltites) are the prevailing rocks types.

Facies Belt 4. Foreslope of carbonate platform
The slope is generally located above the lower limit of oxygenated water, and ranges in depth from above to below the wave base. The material is debris deposited on an incline that forms seaward, and may be as steep as 30 degrees. The sediment is somewhat unstable and varies greatly in size. The bedding contains slumps, mounds, wedge-shaped foresets and large blocks. Various types of limestone are deposited, depending on the water energy upslope (calcisiltites, bioclastic wackestone – packstone).

Facies Belt 5. Organic reef of platform margin
Variations in the ecologic character of this facies depend on the energy gradient, the steepness of the slope, organic productivity, the amount of frame construction, binding, or trapping, the frequency of subaerial exposure and consequent cementation. Prevailing rock type: massive limestone and dolomite in places consisting solely of organisms. Also much bioclastic debris.

For a detailed description of other SMF and facies belts we refer to WILSON (1975). Figure 2 shows the connection between SMF and facies belts. A succession of nine of WILSON's (1975) facies belts reflects a gradual transition from a strictly basinal environment to continental shelf, reef, and lagoonal environments and even into sabkhas. Such an idealized pattern did not develop during the Upper Silurian and Lower Devonian of the Barrandian area. Nevertheless, the use of a microfacies analysis is possible with some modifications.