

# Strontium Chemostratigraphy as an Indicator of Age and Duration of Reef Sedimentation: A Case Study from Koneprusy Reef of Pragian Age (Devonian, Central Bohemia)

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High-resolution stratigraphy of reef complexes is a common problem that is mainly caused by the scarcity of pelagic faunas used for fine biostratigraphical correlations. In this context, the Pragian Koneprusy reef with the most diversified Early Devonian reef community known is no exception. The sedimentation in this complex, located in the Barrandian basins 25 km SW of Prague, started with crinoidal-bryozoan debris and terminated with a proper reef facies. Most of this sequence is classified as Koneprusy Limestone. In studying the Barrandian basins, geologists face the general weakness of Pragian stratigraphical zonation: the threefold subdivision to *sulcatus*, *kindlei* and *pireneae* conodont zones provides very fluctuating and often fading boundaries (Slavik, 1999) and fuzzy outlined *acuaria* and *strangulata* tentaculite zones have no better resolution. This is indeed frustrating as the total time span of Pragian is estimated at 4 Ma (Tucker et al., 1998). Additional principal issue is the existence and duration of stratigraphical lacunae at the lower and upper Koneprusy sequence boundaries. A significant unconformity marks the base of the complex, where the reef limestones cover the eroded Lochkovian calciturbidites. This hiatus corresponds to missing evidence for *pesavis* conodont zone (Hladil, 1997; Slavik, 1998). The erosional nature of the upper limit is also well-known; the maximum estimated time range for this hiatus is from *pireneae* to *inversus* zones (Chlupac, 1956; Slavik, 1998). As the study of fossils has so far failed to produce convincing evidence concerning the timing and total duration of sedimentation at Koneprusy in Pragian times, alternative method has been sought. The steep gradient on the sea water Sr isotope curve observed in the Pragian (Veizer et al., 1999) indicates that strontium chemostratigraphy may have such a potential. In order to date the uppermost part of

the sequence, brachiopods were sampled 10 and 30 meters below the top of a 150-m thick complex in the Certovy Schody East quarry, and in a short interval of beds approximately 25 m below the top of a 80-m thick complex in the Plesivec quarry. The samples for Sr study have been obtained from the secondary shell layer and selected carefully on the basis of their CL study, minor- and trace-element compositions as well as O isotopic ratios. If only presumably little altered brachiopod shells ( $Sr/Mn = 2.3-4.7$ ) are used, the  $^{87}Sr/^{86}Sr$  ratios fall into a restricted range of 0.70840 to 0.70842 ( $n = 4$ ). When compared with the database of Veizer et al. (1999), these values indicate a biostratigraphical age corresponding to the *kindlei* conodont zone. Therefore, the obtained data fit the hypothesis that the uppermost Pragian sedimentation in the Koneprusy reef was either absent or is (largely?) not preserved. On this basis it seems that the Pragian sedimentation here was relatively short-lived.

- Chlupac I, *Centr. Geol. Surv. Bull.*, **31**, 233-243, (1956).  
Hladil J, *Field Trip Guidebook Recoveries '97, Eurocongr. Cent.*, **2**, 31-36, (1997).  
Slavik L, *Bull. Czech Geol. Surv.*, **73**, 157-172, (1998).  
Slavik L, *Abstracts Errachidia Meeting, SDS-IGCP 421*, 39-41, (1999).  
Tucker RD, Bradley DC, Ver Straeten CA, Harris AG, Ebert JR & McCutcheon SR, *Earth Planet. Sci. Lett.*, **158**, 175-186, (1998).  
Veizer J, Ala D, Azmy K, Bruckschen P, Bruhn F, Buhl D, Carden G, Diener A, Ebner S, Goddard Y, Jasper T, Korte C, Pawellek, F, Podlaha OG & Strauss H, *Chem. Geol.*, **161**, 59-88, (1999).