Integrated stratigraphical study of the Rhuddanian-Aeronian (Llandovery, Silurian) boundary succession in the Rheidol Gorge, Wales: A proposed Global Stratotype Section and Point for the base of the Aeronian Stage

Michael Melchiin*†[1], Jeremy Davies[2], Arnoud Boom[3], Julie De Weirdt[4], Andrew Mcintyre[3], Catherine Russell[3], Thijs Vandenbroocke[4], and Jan Zalasiewicz[3]

[1]St. Francis Xavier University – Canada
[2]Aberystwyth University – United Kingdom
[3]University of Leicester – United Kingdom
[4]Ghent University – Belgium

Abstract

The Rheidol Gorge section, approximately 17 km east of Aberystwyth, mid Wales, exposes a ca. 20 m-thick succession of Llandovery (Silurian) strata from the upper Rhuddanian *Pernerograptus revolutus* Biozone through the lower Aeronian *Demirastrites triangulatus* Biozone and basal *Neodiplograptus magnus* Biozone. The section records deposition under a range of bottom-water oxygenation states. The Rhuddanian-Aeronian boundary is located 0.8 m above an abrupt lithological change from predominantly organic-poor, bioturbated 'oxic' mudrocks to an interval of black, richly graptolitic 'anoxic' shales. The graptolite fauna through the boundary interval, including the local lowest occurrence of *D. triangulatus*, allows precise correlation with other parts of the world. Graptolite assemblages indicative of separate divisions in the underlying *revolutus* Biozone and of the lower, middle and upper parts of the *triangulatus* Biozone are also present. Chitinozoans are relatively well preserved in the section and indicate the *Spinachitina maennili* Biozone throughout the boundary interval, as is widely the case. The results of carbon isotope analyses from organic matter indistinctly show the weak interval of positive shift in δ13Corg values through the Rhuddanian-Aeronian boundary interval, as observed globally, though local or regional processes appear largely to overprint the global signal. Overall, the excellent biostratigraphical record, well-documented local and regional stratigraphical context, historical significance, as well as easy access and assured long-term preservation, mean that we propose the Rheidol Gorge section as a strong candidate for a new Global Stratotype Section and Point for the base of the Aeronian Stage.

Keywords: Silurian, Rhuddanian, Aeronian, GSSP, Graptolites, Chitinozoa, Carbon Isotopes

*Speaker
†Corresponding author: mmelchin@stfx.ca