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# The Late Ladinian to Early Carnian *Daonella* and *Halobia* from Spiti (Tethys Himalaya, northern India) and their bearing for the calibration of the Carnian GSSP

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## Abstract

The GSSP of the Carnian stage and of the Upper Triassic series, established in 2008 at Prati di Stuoeres (Dolomites, Italy), was defined on an ammonoid event, the FAD of *Daxatina canadensis*. The Prati di Stuoeres succession yields ammonoids and shows a primary magnetization, but it is poor in conodonts, especially in its lower part, and it lacks of pelagic bivalves of the genera *Daonella* and *Halobia*. These two genera are worldwide distributed and they have been used for long range correlations of Middle to Late Triassic marine facies since the 19th century.

The sedimentary succession of Spiti (Tethys Himalaya), consisting of Kaga and Chomule formations, is very rich in *Daonella* and *Halobia*, and for this reason it was taken into account by the Ladinian/Carnian boundary Working Group as potential candidate for the GSSP. Lack of primary magnetization and low potential for chemostratigraphy prevented from the final selection by the WG, but the abundance of *Daonella* and *Halobia* still makes this succession one of the best in the world.

Here we present the study of a large collection of bivalves that was preliminarily investigated in the early 2000s. Several hundreds of specimens from five sections have been studied. Five species of *Daonella* (*D. pichleri*, *D. bulogensis*, *D. tyrolensis*, *D. lommeli* and *D. n. sp.*) and two of *Halobia* (*H. fascigera* and *H. zitteli*) have been recognized. Ammonoids and conodonts from the same sections provide the chronostratigraphic calibration of the bivalves species. *Daonella* is documented from the Meginae to the Canadensis zones (Upper Ladinian to lowermost Carnian), while the FO of *Halobia* is recorded between the upper portion of Canadensis/lower portion of Aon zones, in the Lower Carnian. Evolutionary trends and correlations with tethyan successions are discussed.

**Keywords:** Ladinian, Carnian, chronostratigraphy, bivalves, ammonoids, conodonts

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