

## A preliminary report on a new Late Jurassic marine vertebrate Lagerstätte from Svalbard, Norway

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Extensive exposures of the Middle Jurassic to Lower Cretaceous Adventalen Group crop out in the Central Basin of Spitsbergen, Svalbard, Norway. Preliminary field reconnaissance in the Agardhfjellet Formation (Upper Jurassic: Kimmeridgian to Tithonian), the lowest formation in the group, reveals the presence of an exceptionally rich marine vertebrate assemblage that includes abundant ichthyosaur and plesiosaur remains. In the study area south of Sassenfjorden, the Agardhfjellet Formation is a 200-210 meter thick succession dominated by grey to black shale that is interpreted to have been deposited in an oxygen-deficient shelf setting. Interestingly, the vertebrate remains are not evenly distributed within the succession; rather, they are stratigraphically restricted to a fossiliferous interval approximately 15-20 meter thick interval within the uppermost unit of the formation, the Slottsmøya Member. While only 10 field days have been dedicated to prospecting for new finds, approximately 40 individual skeletal occurrences (multiple, identifiable elements) have been mapped in the Slottsmøya Member. All together 7 ichthyosaurs, 2 short-necked, and 31 long-necked plesiosaur skeletons have been identified. In contrast, the underlying Jurassic units of the Agardhfjellet Formation and overlying Rurikfjellet Formation are largely devoid of vertebrate remains. To date, all identifiable vertebrate remains from the Slottsmøya Member, including six partial skeletons collected in 2004 and 2007, are referable to either Ichthyosauria or Plesiosauria. Ichthyosaur remains are significant in that they are the first Jurassic-aged material of this group to be described from Svalbard. Identifiable remains include a complete and well preserved skull and one partial postcranial skeleton, all of which are referable to Ophthalmosauridae. Plesiosaur remains include representatives of both long-necked and short-necked morphotypes. Two partial skeletons, both possessing cranial and postcranial material, resemble somewhat the poorly known Kimmeridgian taxon from England, *Kimmerosaurus*. Postcranial remains of an associated skeleton collected in 2007 may represent a second long-necked taxon. Significantly, the Slottsmøya assemblage also includes a semi-articulated partial skeleton of an enormous short-necked plesiosaur resembling the European taxon *Pliosaurus*. Based on dimensions of its partial skull, axial skeleton, pectoral girdle and limbs, it represents an animal estimated 15 meters in length, one of the longest and most massive plesiosaurs yet found. At a global scale, the Slottsmøya vertebrate assemblage represents a significant new locality for Mesozoic marine tetrapods comparable to that of other well-known, time equivalent Lagerstätten as the Oxford Clay and Kimmeridge Clay Formations of England, and the Vaca Muerta Formation of Argentina.

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