ISOS-14 Field Guide
The Ordovician of Estonia

Edited by Olle Hints and Ursula Toom

14th International Symposium on the Ordovician System, Estonia, July 19-21, 2023
Pre-conference Field Excursion: The Ordovician of Estonia, July 15-18, 2023

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Stop 12: Männamaa drill core, western Estonia

Marko Kabel

Location: Latitude 58.83816°N, longitude 22.62839°E; Hiiumaa Island, western Estonia.
Stratigraphy: Complete Ordovician succession from the Tremadocian to Hirnantian.
Status: Reference section, drilled for geological mapping in 1988.
More information: https://geoloogia.info/en/locality/498

The Männamaa (F-367) borehole was drilled in the central part of Hiiumaa Island, western Estonia, with the aim of 1:200000 deep geological mapping (Põldvere 2008). The borehole is 358.3 m deep. The Ordovician strata in the Männamaa core are covered by the 29 m thick Quaternary cover and ca 17 m of Silurian limestones. Ordovician strata start from a depth of 46 m and continue until 183 m. Being near to the Kärdla impact crater (Sandbian in age), the succession is weakly influenced by its ejecta in the Tatruse Formation, Haljala Regional Stage. During different periods, the core has been sampled for microfossils (chitinozoans, acritarchs, ostracods etc), geophysics and geochemistry (e.g., Grahn et al. 1996; Hints et al. 2010; Kiipli et al. 2008; Meidla and Ainsaar 2008; Meidla and Tinn 2008; Nõlvak 2008; Põldvere et al. 2008; Shogenova and Shogenov 2008; Truuver et al. 2021; Suuroja et al. 2008; Uutela 2008).

Fig. 12.1. Männamaa F-367 core box No 34, showing a series of Sandbian K-bentonites with the Kahula Formation, including the infamous Kinnekulle Bed, which marks the base of the Keila Regional Stage. Photo from the Estonian Land Board database.

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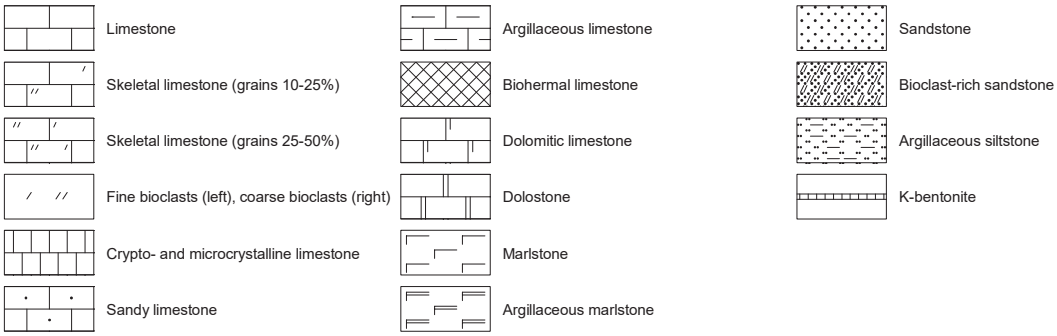
Lithological log legend:



Männamaa (F-367) core interval 37-190 m

Series	Stage	Fm.	Depth 1:200	Lithology	Description/notes
O3-S1 Upper Ordovician-Llandovery	Juuru	Varbola	38.0 – 46.0		37,0-46,0 m – Limestone (grains 10-40%) with marlstone films and interbeds (10-20%), light-grey, texture: indistinctly medium- to thin-bedded and nodular. Some interlayers (thickness up to 20 cm) contain carbonate clasts (mainly 1-3 cm across). Rounded stromatoporoids reach 5 cm in size. Discontinuity surfaces are pyritized.
	Porkuni	Ärina	46.0 – 46.5		46,0-46,5 m – Cryptocrystalline limestone (Koigi Mb.; grains <10%, in some layers <50%) with marlstone films and interbeds (<5%), light yellowish-grey to grey, in some layers pyritized, texture: indistinctly medium- to thin-bedded.
			46.5 – 48.0		46,5-49,1 m – Biohermal limestone (Tõrevere Mb.; grains often >50%; boundstone), in some layers dolomitized, light-grey, texture: indistinctly wavy-bedded to massive. 49,1-49,3 m – Limestone (Siuge Mb.; grains <25%), brownish-grey with calcitic marlstone interbeds (5%).
			48.0 – 50.0		49,3-50,4 m – Limestone (Vohilaiu Mb.; grains 10-50%), light brownish-grey, in some layers dolomitized and argillaceous.
			50.0 – 52.0		50,4-52,2 m – Dolostone (Rõa Mb.; grains <25%), light brownish- to greenish-grey with dolomitized bioclast-rich and argillaceous limestone layers, texture: massive. The discontinuity surface is pyritized.
	Pirgu	Adila	52.0 – 68.0		52,2-68,2 m – Limestone (grains 10-25%, in some layers <10% or >50%) with argillaceous limestone and marlstone (bioclasts up to 20%) interbeds (5-20%), light-grey, the upper 2,5 m light yellowish- to brownish-grey, uppermost part dolomitized, in places greenish-grey and pyritized, texture: indistinctly thin- and medium-bedded with nodular intervals. Carbonate clasts (0,5-3,0 cm across) containing intervals are up to 20 cm thick. At 54,1 m the pentamerid brachiopod Holorhynchus giganteus is found. Discontinuity surfaces are pyritized.
		Moe	68.0 – 86.0		68,2-87,0 m – Limestone (grains 10-30%, in some layers <10% and >50%) with marlstone interbeds (<5%), light brownish-grey, texture: thick-bedded, in places nodular or indistinctly thin- to medium-bedded intervals. Carbonate clasts (0,5-4 cm across) are observed in up to 10 cm thick intervals. Fragments of calcareous algae Palaeoporella (Dasyporella) are found. Discontinuity surfaces are pyritized.

Fig. 12.2. Ordovician succession in the Männamaa F-367 drill core, Hiiumaa Island, western Estonia.

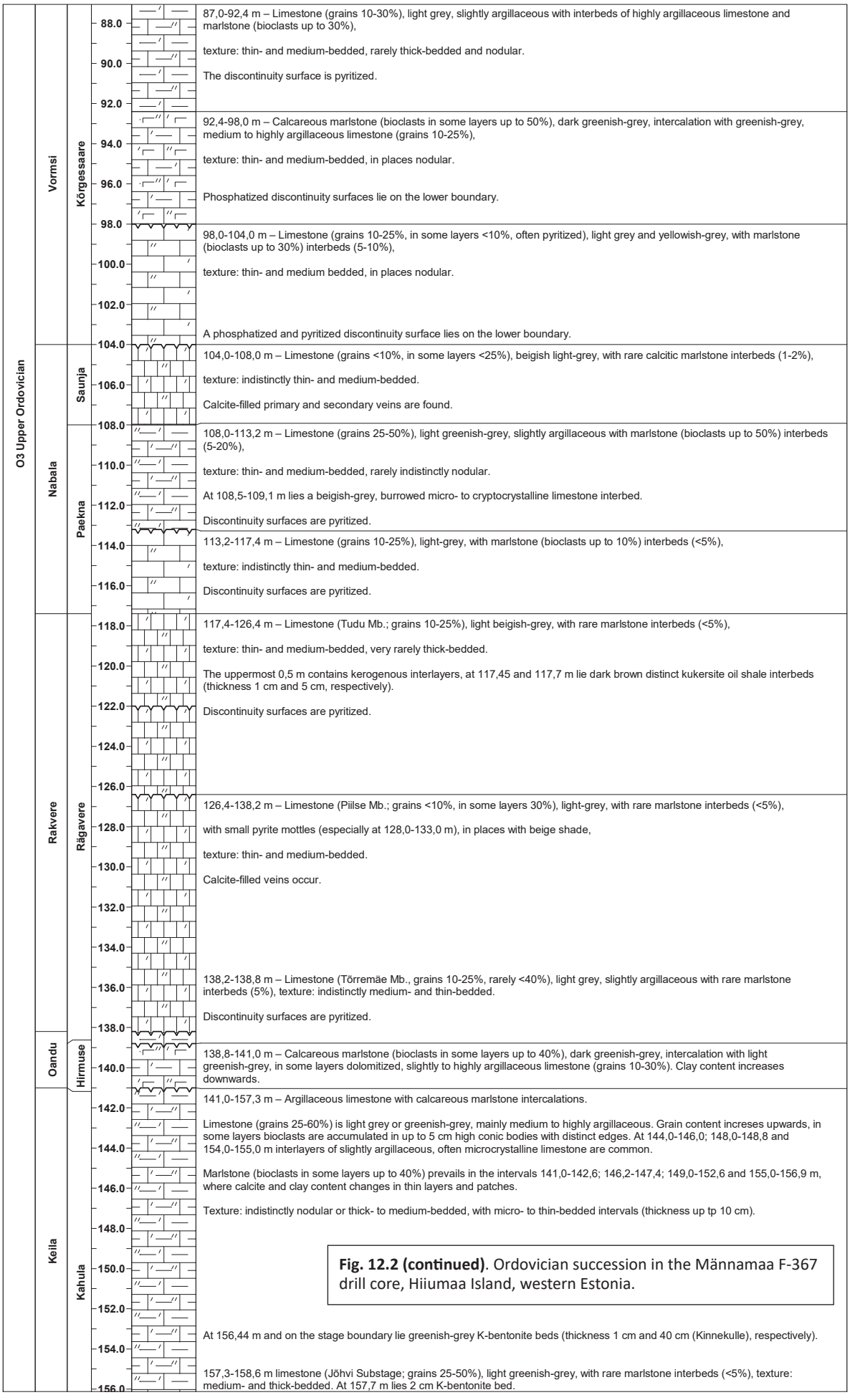


Fig. 12.2 (continued). Ordovician succession in the Männamaa F-367 drill core, Hiiumaa Island, western Estonia.

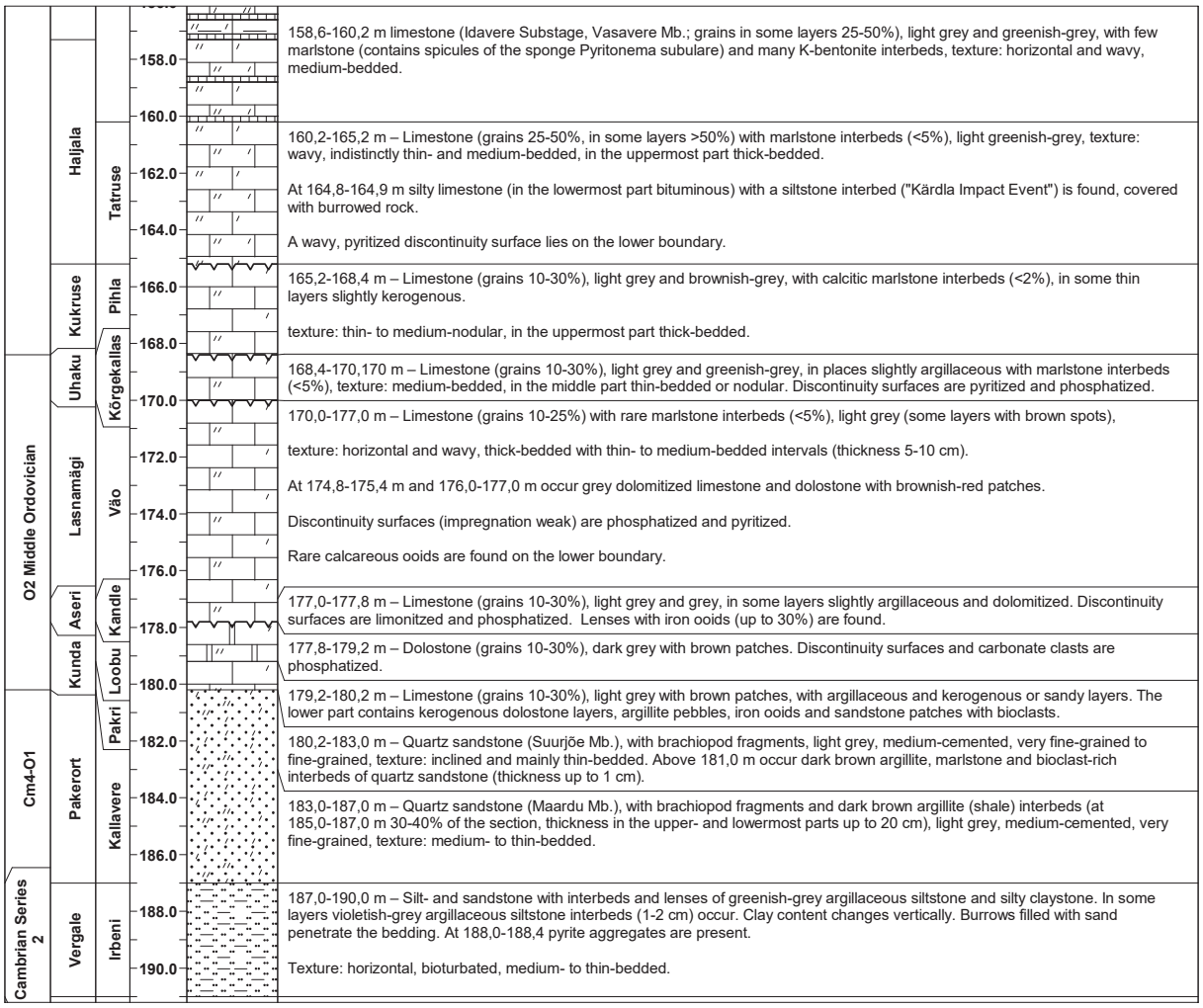


Fig. 12.2 (continued). Ordovician succession in the Männamaa F-367 drill core, Hiiumaa Island, western Estonia.