

Impact of ash-falls on the diversity of Ordovician ostracods

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The impact of two Ordovician ash-falls of different intensities was studied in order to determine the different recovery patterns of the benthic faunas (ostracods) in the Baltoscandian area (Estonia). The Kinnekulle bentonite has a very large geographical extension (Denmark – westernmost Russia); it marks the base of the Keila regional stage (former Ristna Substage; Sandbian) and is 40 cm thick in the Põõsaspea section (North West Estonia). Located approximately 5 m above the latter, the Grimstorp bentonite marks the base of the former Laagri Substage (Sandbian) and is nearly 10 cm thick in the Ristna section (North West Estonia).

High-resolution sampling (bed by bed) was performed and the distribution of ostracods was recorded and analyzed. More than 80 species of ostracods both palaeocopes and “non palaeocopes” were identified. In Põõsaspea section very important faunal changes are observed above the Kinnekulle bentonite. The five pre-crisis dominant species are not found in the section above the bentonite and one species (*T. memorabilis*) gets extinct. In Ristna section the impact of the Grimstorp bentonite is less dramatic. Strong similarities in the abundance and diversity changes are observed after both bentonites. These results show that significant ash-falls (e.g., Kinnekulle) will lead to strong faunal extinctions and renewal at least locally. If the volcanic episode is less prominent (e.g., Grimstorp), only local temporary extinctions are observed. In both case, recolonization of the environments occurs rapidly after the crisis and follows several distinct steps:

- Post-event ecosystem with “survival faunas” (very low abundance; relatively high diversity).
 - Early stages of recovery with “re-colonizing faunas” (high abundance; low diversity). In both studied sections, one species (opportunistic taxa) dominates the ecosystem.
 - Return to more stable conditions (average abundances; more diverse assemblages).
 - Finally, normal “climax assemblages” with specialized taxa (high abundance; high diversity).
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