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ABSTRACT BOOK

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Scouring around a fossil organism (Cincta, Echinodermata): Physical modelling and morpho-functional analysis

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The study of atypical echinoderms like cinctans is problematic, because they cannot be anatomically compared to other taxa. Studying the hydrodynamics of feeding in this class is a promising source of information about their ecology (Rahman et al., 2015). We designed a protocol that aims to extend this study to the scouring processes around a representative cinctan species: *Protocinctus mansillaensis* (Cincta, Echinodermata). Three-dimensional models of the species were printed and placed in a racetrack flume and then exposed to various current velocities to study the scouring mechanisms around the body of *P. mansillaensis*. Quality of the current modelling was assessed using particle image velocimetry, reliefs and evolution of the produced scour marks were measured with a stream gauge, and current parameters were measured with an acoustic Doppler velocimeter. Our results show that this protocol can be used to model the cinctans' habitat and gives results that are consistent with literature. Analysing scouring around the cinctan models showed that this species has a maximized stability when it is oriented with its stele towards current. We also observed sedimentation inside the food grooves of the animal in this orientation, which supports the hypothesis that cinctans were passive suspension feeders with brachioles.

References

Rahman, I.A., Zamora, S., Falkingham, P.L. & Phillips, J.C. 2015. Cambrian cinctan echinoderms shed light on feeding in the ancestral deuterostome. *Proceedings of the Royal Society B: Biological Sciences*, **282**:20151964.