

The significance of contourites in marine palaeoenvironmental studies

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Abstract

Contourite drifts are sedimentary deposits in oceanic or lake basins, which are influenced by an alongslope bottom current. Behind this rather straightforward definition hides a wide variety of complex environmental settings, as well as the possible diagnostic criteria. Although the contourite paradigm is not new to marine sedimentology, being nearly as old as the turbidite paradigm, it has only received the deserved attention some 2 decades ago due to a renewed interest due to technical and analytical developments in palaeoceanography and marine geophysics, as well as a growing awareness of its economic potential. In 2014, a total of 117 contourite drifts were identified, but this number is steadily growing. Still, the impact and occurrence of these deposits remains underestimated and understudied, which is probably due to a low awareness of its diagnostic criteria and applicability. Admittedly, the further progress is made in understanding these deposits, also more complex questions arise. Here we will highlight some exemplary issues that may be of application for the Belgian scientific community.

In the first place, contourites and palaeoceanography are closely tied to each other. The composition and dynamics of the bottom water masses lying at the base of the bottom current flow may be reconstructed using geochemical analyses or in studying seismic profiles through the sediment drift. However, still a lot needs to be understood how physical oceanographic processes actually affect the sedimentary record. Therefore, a close(r) collaboration with physical oceanographers and modellers becomes an essential step in future studies. Secondly, contourites and deep-water ecosystems nearly go hand-in-hand. For example, the presence of cold-water coral mounds can almost be used as a clear indication of contourites in the near vicinity. The bottom currents are needed to sustain the ecosystem in terms of food particle delivery, but also to keep them free from sedimentation. On the other hand, larger biogenic constructions may increase the ambient hydrodynamic behaviour through obstacle-related enhancing of the bottom current flow. This knowledge may also be crucial in studies of “ancient” marine deposits which are now outcropping on land sections. Whereas the marine environment hosts many possibilities to study contourites, the land sections are even more complex due to their poor accessibility and analytical constraints. Therefore, the translation of the present diagnostic criteria towards land sections necessitates further attention... and maybe this means that during the next Geologica Belgica congress contourite deposits in Belgium will be announced?