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Land-sea mapping and deformation kinematics in the Cape Gris-Nez fault zone (Dover Strait, Eastern Channel)

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The Dover Strait, at the transition between the Eastern English Channel and the North Sea, lies on a complex faulted bedrock, making it a potential seismic risk area. Resulting from recent periglacial processes, it cross-cuts the geological structures inherited from the major tectonic deformations that affected the West European margin at the Late Jurassic-Early Cretaceous (extension and subsidence due to the propagation of the opening of the North Atlantic Ocean) and during the Cenozoic (compression causing the inversion of basins linked to the African-Eurasian convergence). Cape Gris-Nez is one of the most striking features of the fault system bordering the inverted Weald-Boulonnais basin. The Sirène beach, which has been heavily cleared of sand over the past 20 years, reveals the complexity of the folded and faulted geological structures associated with the development of this deformation zone. Over the last few years, detailed structural surveys have been carried out on land, using GNSS layer-to-layer mapping, and at sea, using very high-resolution SPARKER seismic profiles, providing an overall land-sea map of this fault zone. This first-rate mapping was recently supplemented by photogrammetric surveys by drone at very high spatial resolution (5 cm) making it possible to obtain an ortho-mosaic and a digital terrain model of the foreshore and cliffs of Cap Gris Nez. The interpretation of these very high-resolution images, adopted in a new structural survey campaign, leads to an optimization of the mapping of structures and a better understanding of the geometry and kinematics of deformations at the fault zone preliminary data for a better definition of seismic risk in the sector.