# Monitoring Sand Dynamics based on Hypertemporal Terrestrial Lidar data

**Greet Deruyter, Jeffrey Verbeurgt, Lars De Sloover (Belgium), Sander Vos (Netherlands) and Alain De Wulf (Belgium)**

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**SUMMARY**

In order to protect the Belgian coast, knowledge on natural sand dynamics is essential. Monitoring sand dynamics is commonly done through sediment budget analysis, which relies on determining the volumes of sediment added or removed from the coastal system. These volumetrics require precise and accurate 3D data of the terrain on different time stamps. Earlier research states the potential of permanent long-range terrestrial laser scanning for continuous monitoring of coastal dynamics. For this paper, this methodology was implemented at an ultradissipative macrotidal North Sea beach in Mariakerke (Ostend, Belgium). A Riegl VZ-2000 LiDAR, mounted on a 42 m high building, scanned the intertidal and dry beach in a test zone of ca. 200 m wide on an hourly basis over a time period of one year. It appeared that the laser scanner could not be assumed to have a fixed zenith for each hourly scan. The scanner compensator measured a variable deviation of the Z-axis of more than 3.00 mrad. This resulted in a deviation of ca. 900 mm near the low water line. A robust calibration procedure was developed to correct the deviations of the Z-axis. In this paper, we start by presenting the first results achieved with the current methodology. Next, we analyze the results from a 10-day measurement campaign and highlight the tide-dominated beach morphology.