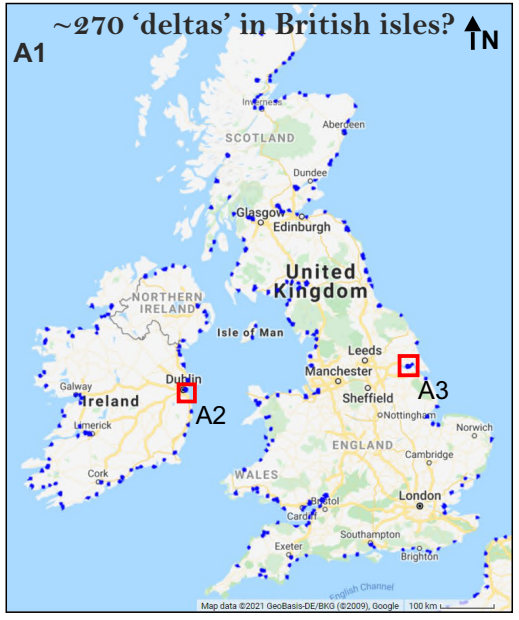
Big Data-driven geomorphic analysis of the world's river deltas: a need for caution and rigour

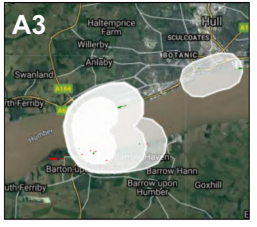
Florin Iulian Zăinescu[1,2] and Edward Anthony[3]
1: Strasbourg Earth and Environment Institute, Unistra, France (zaiflorin@gmail.com), 2: University of Bucharest, Romania, 3: Aix Marseille University, France

Check our preprint submitted to Nature Matters Arising
https://zenodo.org/record/4724630

A critical analysis of the dataset of *Nienhuis et al. Global-scale human impact on delta morphology has led to net land area gain. Nature (2020) - (N2020)*
N2020 paper identifies 10,848 marine river "deltas" and uses (AquaMonitor) to retrieve surface-water changes within selected 'buffer' areas for each delta and identify land change.
The dataset rests on an unconventional definition of deltas, spurious delta area changes and statistics, and does not support the conclusion stated in the title of N2020.

10848 'deltas' or river mouths?



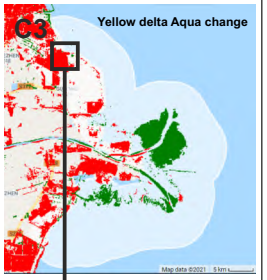


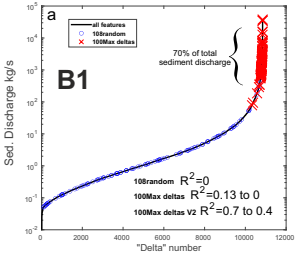
Land change comparison

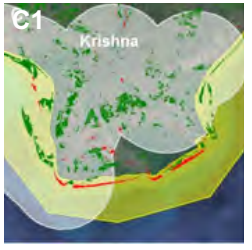
Our check (1: a random sample of 108 river mouths; and 2: the 100 largest deltas in N2020 dataset- 100Max deltas) shows that the land changes N2020 attributed to most deltas are spurious (B1,2). The original dataset (V1) includes fallacious delta plain anthropogenic changes taken as natural coastal changes (C) due to bad buffers and insufficient filtering and verification. R^2 of land change is 0 for 108 random river mouths and close to 0 for 100Max deltas.

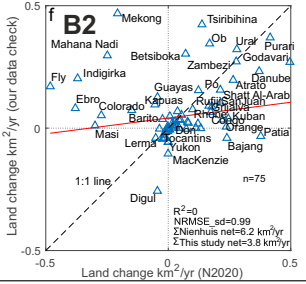
The authors use Qdist - Qprist (difference of disturbed and pristine river sediment flux) to state that '*Human-induced changes to the fluvial sediment flux explain 16% of the recent delta land area*'. This was based on spurious data (D) from the Yellow delta.

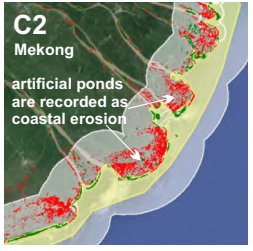
Since our abstract submission, the corresponding author uploaded a new dataset (V2) with corrected manually obtained buffers for the 100Max deltas.
Problems remain for the 10748 'deltas' and some individual inaccuracies still exist for some large deltas (R^2 0.7 to 0.4).











present land cover: aqua-culture

This dataset does not show that humans have contributed net land gain in deltas