

Supplementary Material

Table S1. Description of the input data layers (*denotes data were acquired through a data request to the relevant organization).

Data Name	Description	Source
Sentinel 3 A, B	Optical satellite	https://codarep.eumetsat.int/Authentication - EUMETSAT - EO Portal User Registration Data up until 1 year old: https://coda.eumetsat.int For the description of the source please visit here .
Nutrients	Water quality data collected under national monitoring programmes; inorganic nutrients (nitrite, nitrite+nitrate, silicate, phosphate, ammonium), suspended particulate matter, salinity and chlorophyll	Environment Agency (Open WIMS data), Natural Resources Wales* (https://naturalresources.wales/?lang=en), Cefas* (https://data.cefas.co.uk/), Agri-Food & Biosciences Institute (Afbi)*
River flow	Gauged daily flow data (m ³ /s).	National River Flow Archive (NRFA; http://nrfa.ceh.ac.uk/data/search)

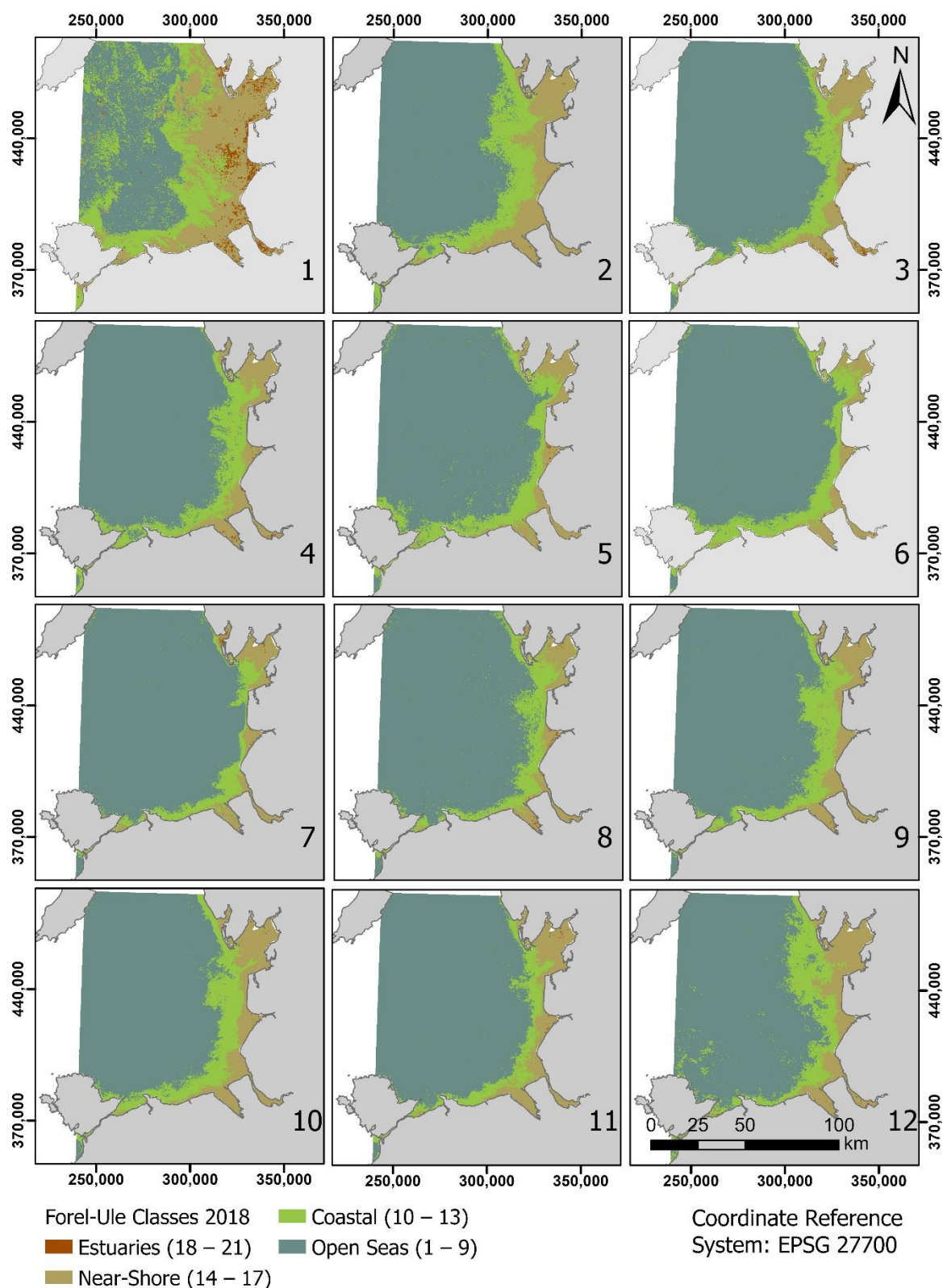


Figure S1. Spatial changes observed in the river plume extent (FUI > 10) in 2018 suggest the presence of three seasons: 1. Wet season (months: 12, 1, 2, 3); 2. Dry season (months: 5, 6, 7, 8) and 3. Mixed season (months: 4, 9, 10, 11).

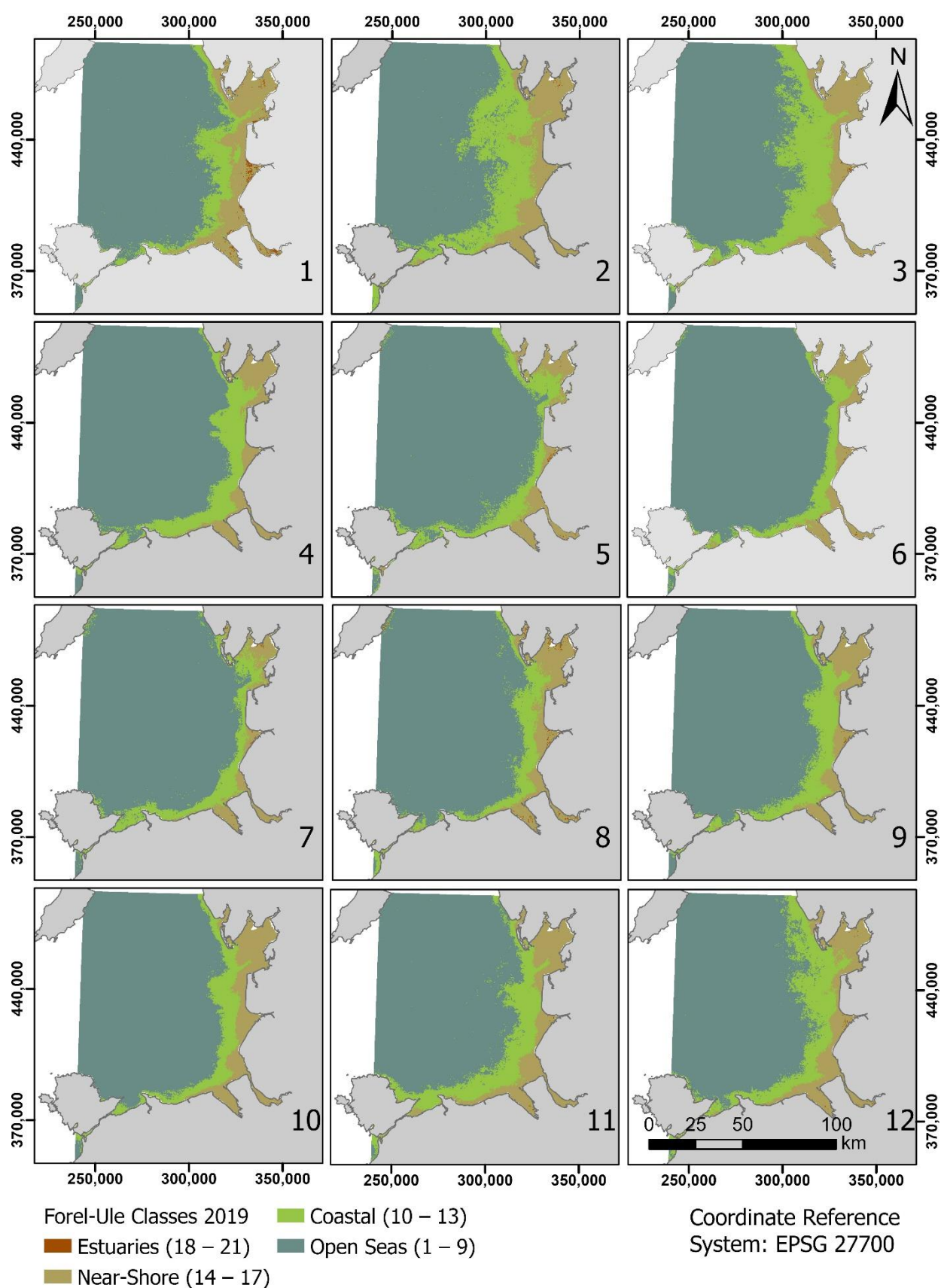


Figure S2. Spatial changes observed in the river plume extent ($FUI \geq 10$) in 2020 suggest the presence of three seasons: 1. Wet season (months: 12, 1, 2, 3); 2. Dry season (months: 5, 6, 7, 8) and 3. Mixed season (months: 4, 9, 10, 11).

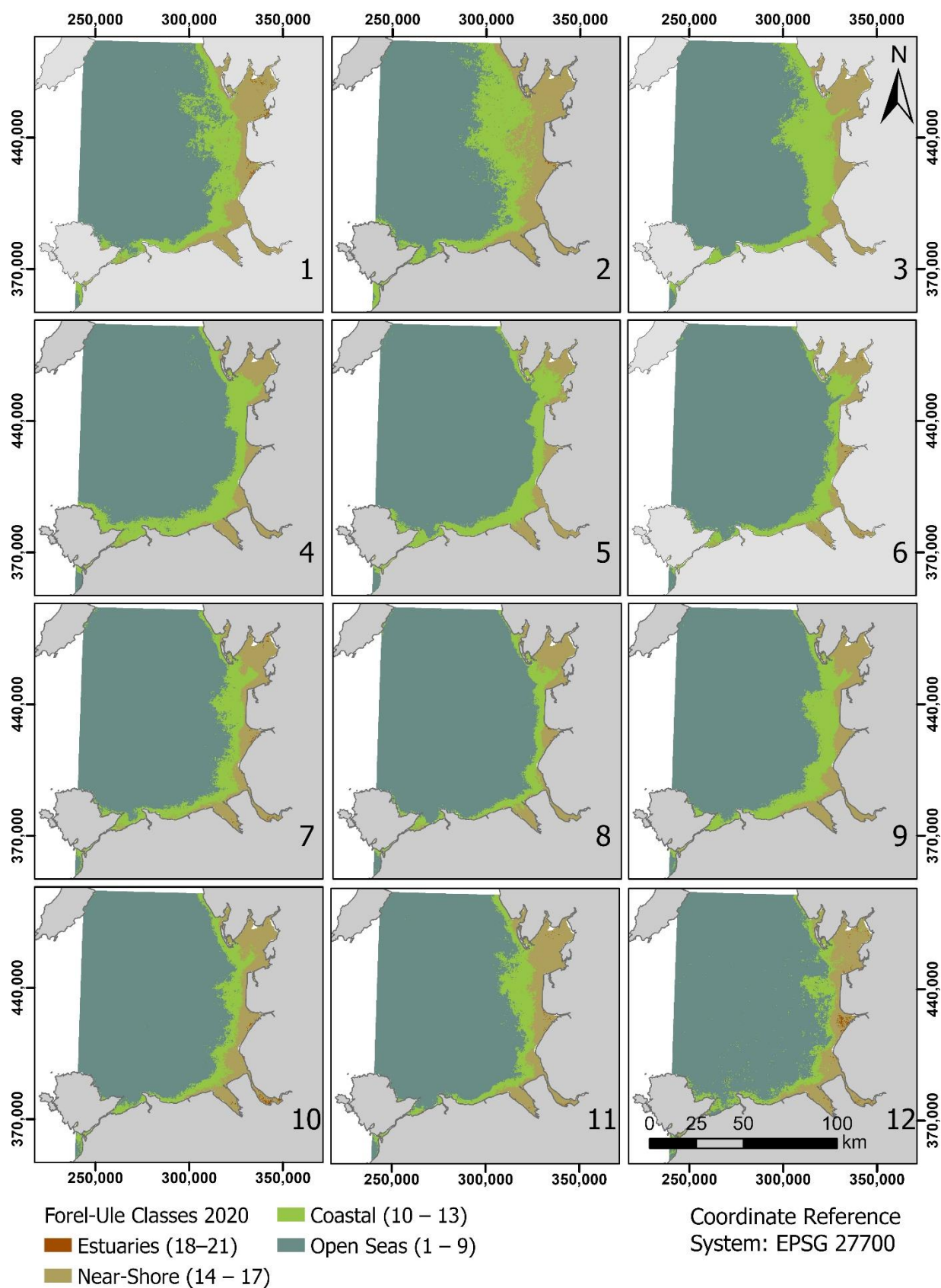


Figure S3. Spatial changes observed in the river plume extent (FUI ≥ 10) in 2017 does not show the presence of the three seasons: wet, dry and mixed. The river plume across all months in 2017 is relatively constant.

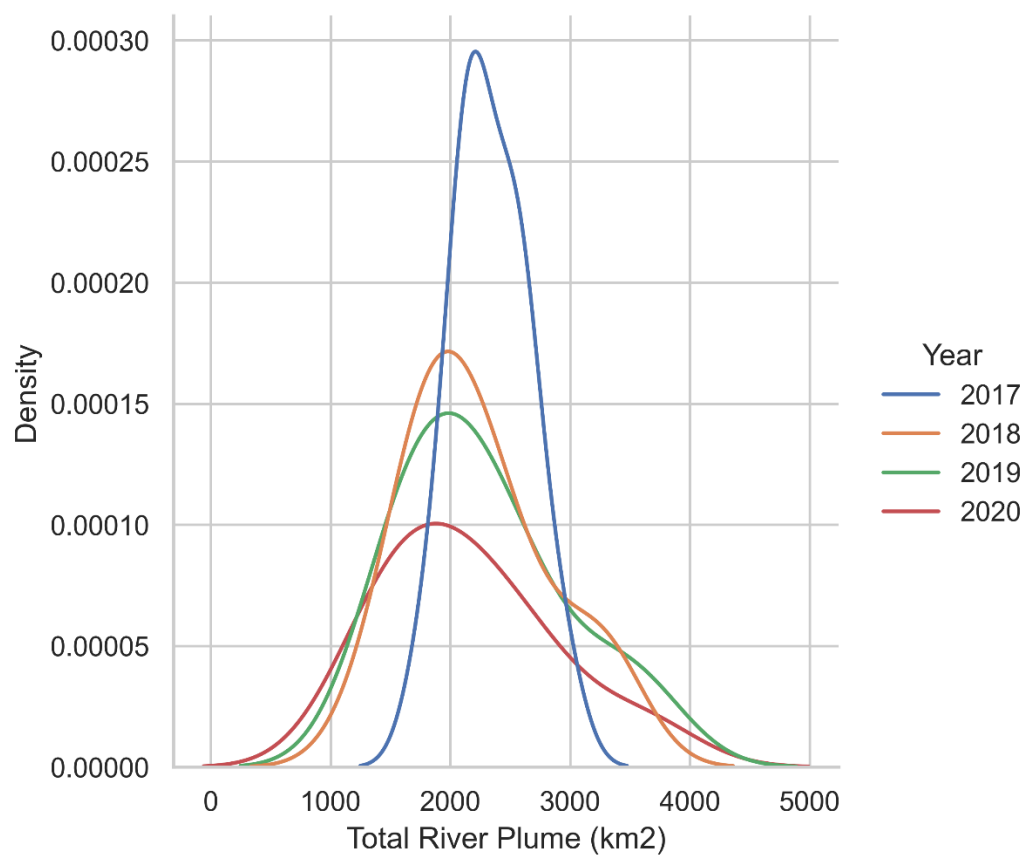


Figure S4. Kernel density distribution of the river plume data between 2017–2020.

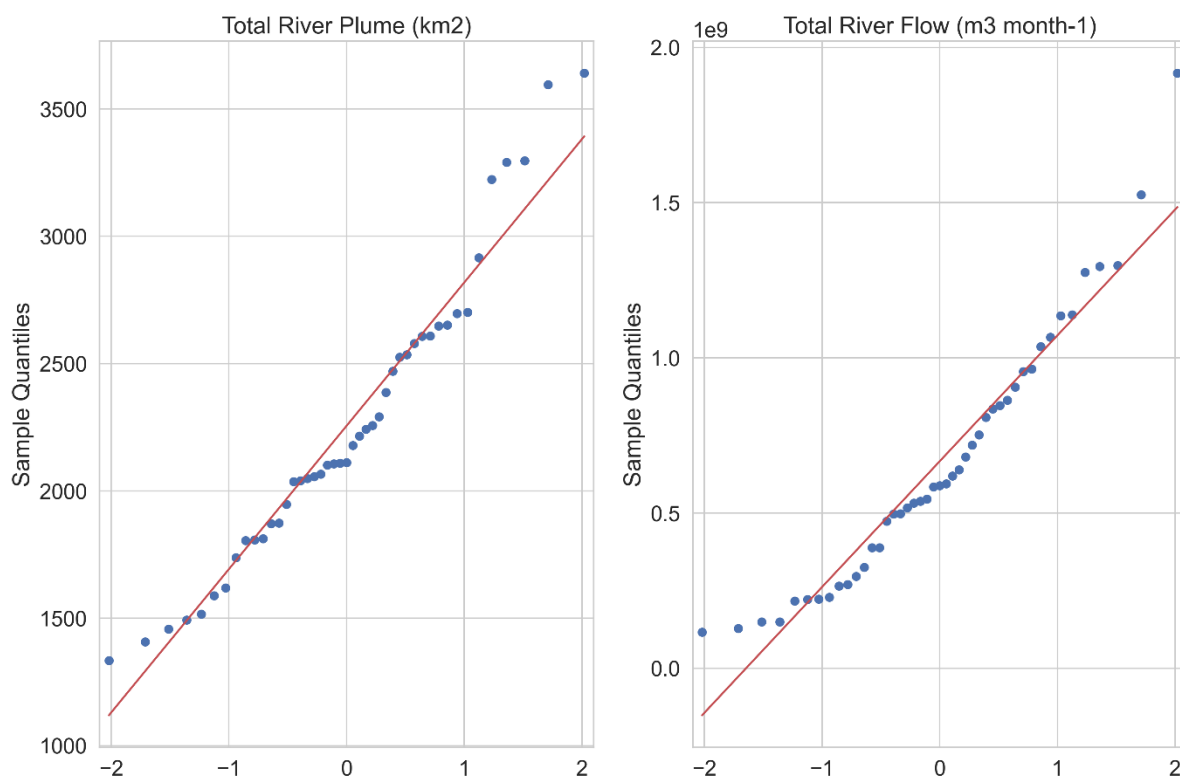


Figure S5. Q-Q plots showing a non-normal distribution of river plume and river flow data.

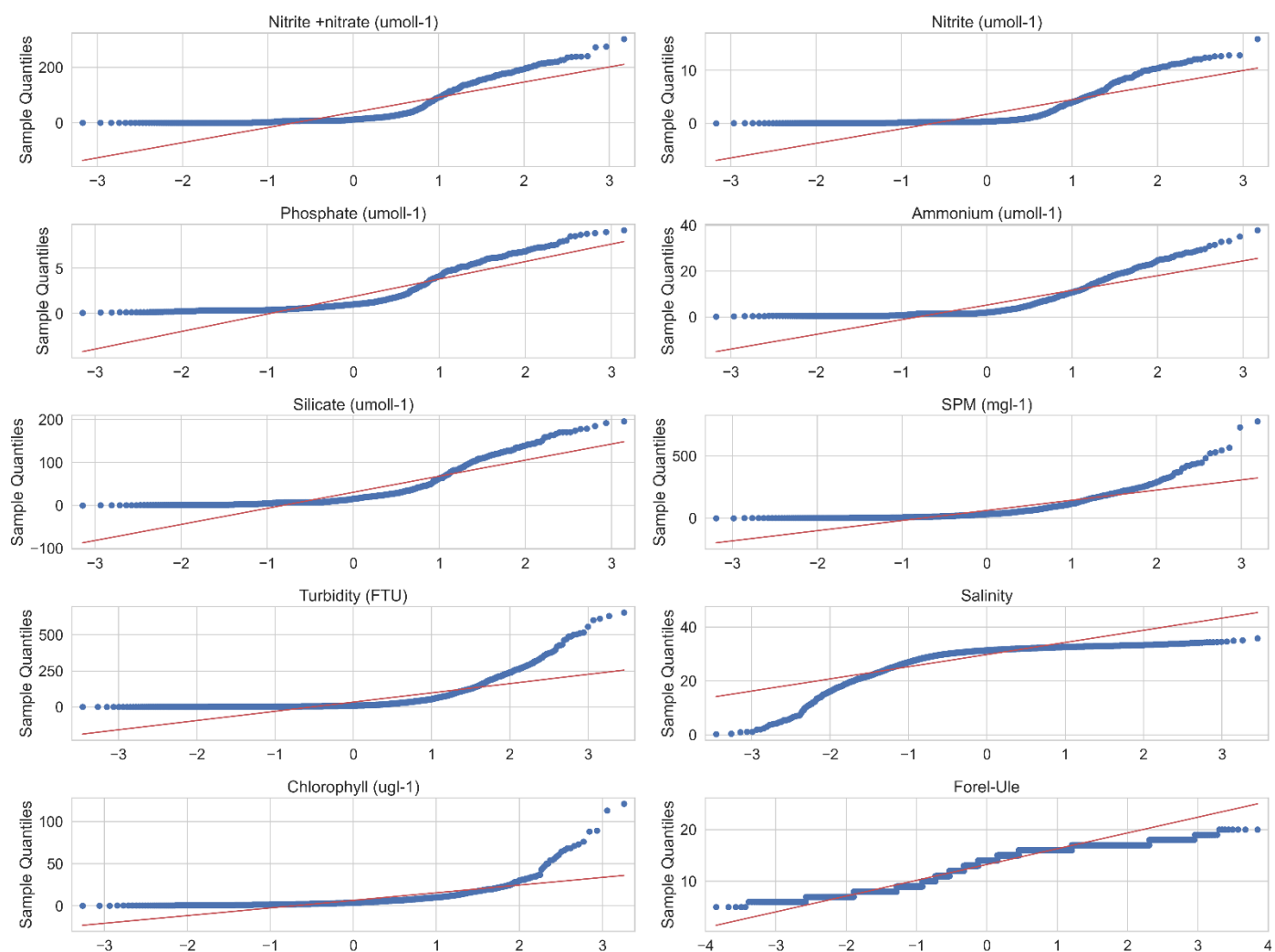


Figure S6. Q-Q plots for all the in-situ collected data and FUI show non-normal distribution.