

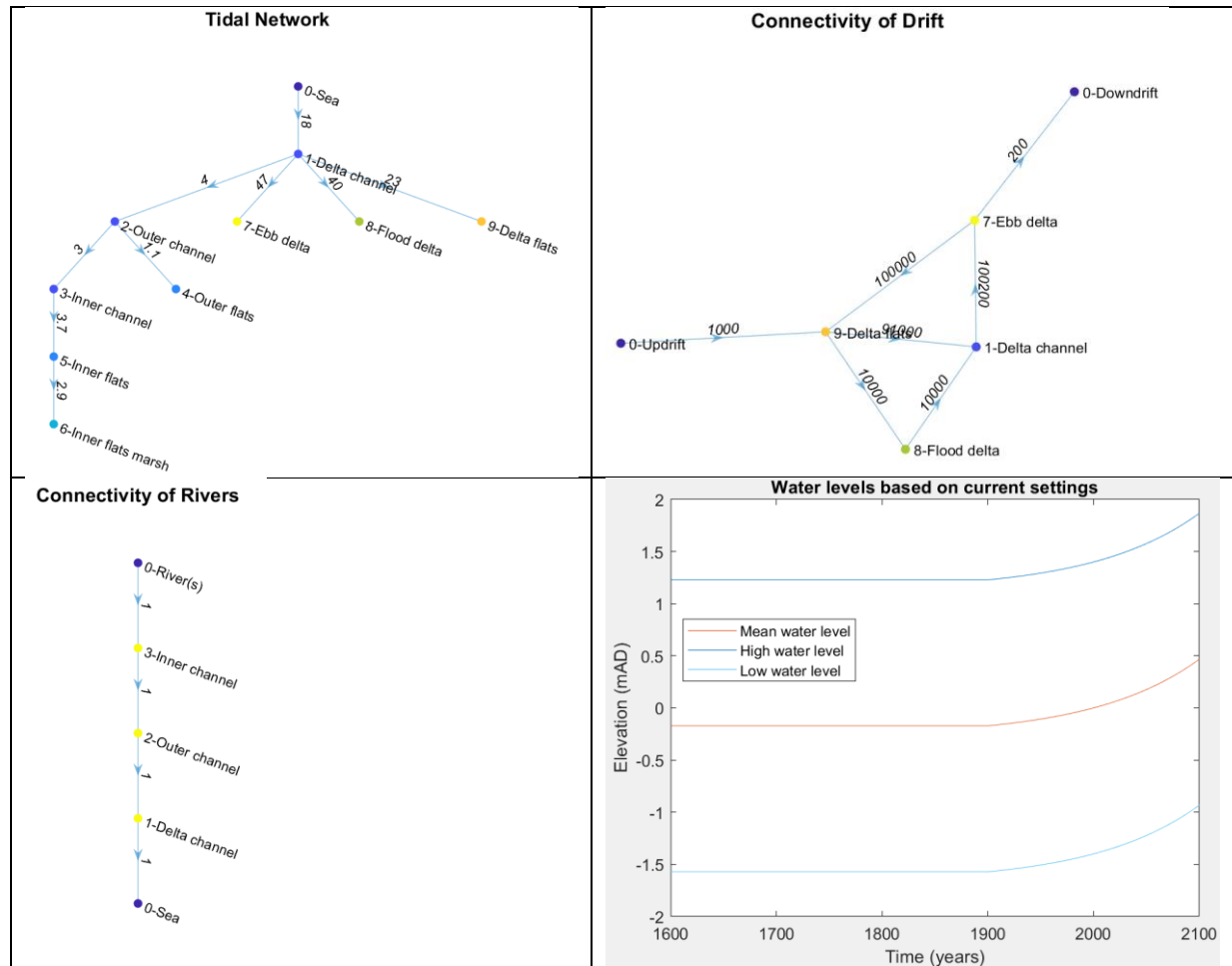
Modelling the morphological response of the Oka estuary (SE Bay of Biscay) to climate change.

Roland Garnier, Ian Townend, Manu Monge-Ganuzas, Iñaki de Santiago, Pedro Liria, Aritz Abalia, Irati Epelde, Andrea del Campo, Guillem Chust, Mireia Valle, Manuel González, Julien Mader, Mariluz Gómez, Carlos Castillo, Adolfo Uriarte

Supplementary Information

The model parameters were varied from a baseline setup, which is summarised below.

Networks of tidal and advective flow connectivity and simulation water levels.



System Properties

Equilibrium density (kg/m ³)	0.318
River concentration (kg/m ³)	0.003
Tidal Amplitude (m)	1.4
Tidal Period (hr)	12.4
Mean sea level (mAD)	0
Rate of sea level rise (m)	-0.1
Tidal Cycle Amplitude (m)	0.09
Tidal Cycle Period (yr)	18.6
Tidal Cycle Phase (yr)	12.2

* Simulates an exponential rate of increase from 1900

Element Properties

Element name	Type	Volume	Surface area	Length	Vertical exchange	Transport coefficient	Bed density
Delta channel	Channel	1780160	412000	2850	0.02	5	1650
Outer channel	Channel	464600	135600	900	0.02	5	1650
Inner channel	Channel	920080	246000	4000	0.02	5	1650
Outer flats	Tidal flat	491960	257600	900	0.003	5	1350
Inner flats	Tidal flat	1579960	1304400	4000	0.003	5	1350
Inner flats marsh	Saltmarsh	1233639	1150800	4000	0.003	5	1350
Ebb delta	Ebb Delta	3503760	404800	600	0.02	-5	1650
Flood delta	Flood Delta	926800	551200	1500	0.02	5	1650
Delta flats	Delta Flat	891360	466000	750	0.02	5	1650

Saltmarsh Properties (3 species)

Minimum Species Depth	0.78	0.32	-0.12
Maximum Species Depth	1.31	0.96	0.59
Maximum Biomass	0.5	2	2
Species Productivity	0.15	0.015	0.015
Settling Coefficient - Alpha	0.00004		
Settling Coefficient - Beta	0.56		

Element Equilibrium Coefficients

Used 'Generic' coefficients for tidal prism relationship ($V \propto \alpha P^\beta$) rescaled to initial volumes (i.e. assuming the initial condition is close to equilibrium).

Element type	alpha	beta
Channel	0.005	1.23
Tidal flat	0.08	1.08
Saltmarsh	0.08	1.08
Flood delta	7000	0.37
Ebb delta	0.005	1.23
Delta flat	0.008	1.08

* Only applies when no saltmarsh present