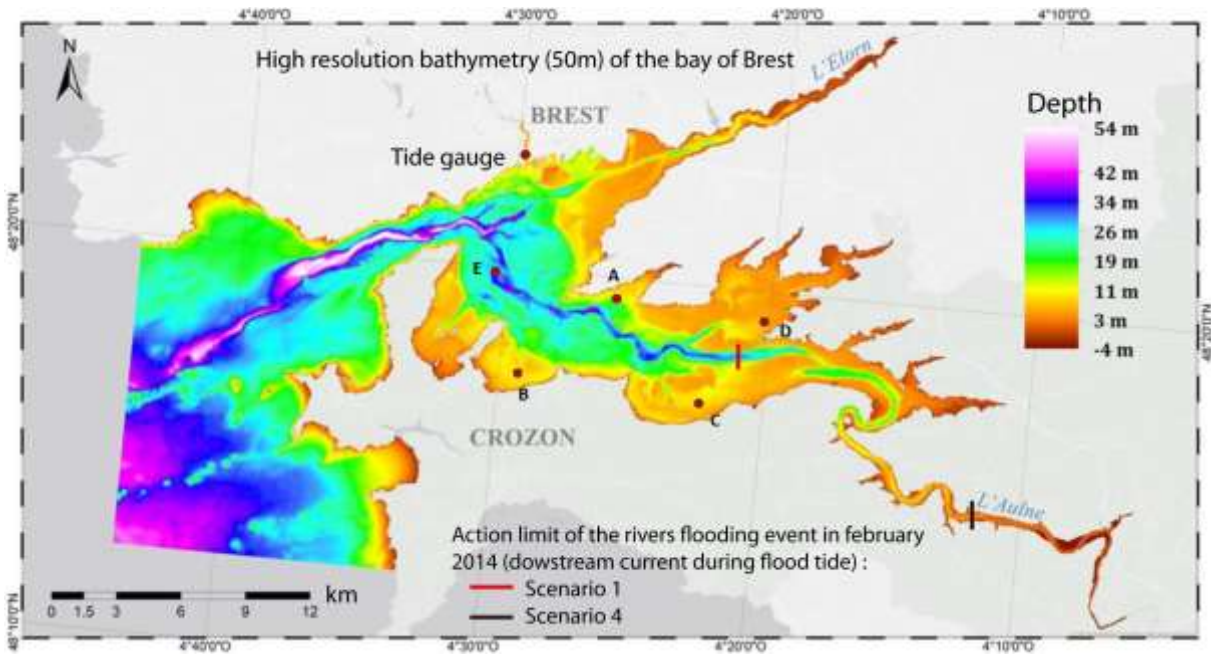


1 **Supplementary material:**

2 A lot of validation work were already done by several authors (see part 3.1). A further validation is
 3 carried out. The model outputs are compared with 5 ADCP and the tide gauge of the Brest harbour
 4 (appendix 1). It concerns a case with a spatialized roughness length (appendix 2) and a uniform
 5 roughness length equal to 3.5mm (appendix 3).

6



7

8 Appendix. 1: High resolution bathymetry, with the position of all ADCP and the tidal gauge of Brest
 9 harbour. A, B, C, D recorded during 1 month (October 2014, Petton et al., 2016), E during 24 days (16
 10 of July, ENSTA) and the tidal gauge during the entire year 2014. The action limit of one rivers flooding
 11 event during a flood of neap tide (February 2014, described in section 4.1) corresponds to black and
 12 red line.

13

14 Appendix 2: Validation of simulated currents with a spatialized Z0

Localisation	Variable	Percentage correlation (%)	RMSE	Willmott index
Tidal gauge	free surface	99	0,27m	0,93
ADCP A	U barotrope	70,3	0,1	0,47
	V barotrope	-11,2	0,06	0,37
ADCP B	U barotrope	61,7	0,04	0,57
	V barotrope	82,6	0,03	0,64
ADCP C	U barotrope	96,4	0,04	0,87

	V barotrope	75,9	0,02	0,62
ADCP D	U barotrope	96,6	0,05	0,82
	V barotrope	95,4	0,05	0,78
ADCP E	U barotrope	89,6	0,14	0,65
	V barotrope	97,5	0,16	0,74

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16

Appendix 3: Validation of simulated currents with a uniform Z0 (3.5mm)

Localisation	Variable	Percentage correlation (%)	RMSE	Willmott index
ADCP D	U barotrope	95.9	0.05	0.81
	V barotrope	95.1	0.05	0.78
ADCP E	U barotrope	85.7	0.16	0.62
	V barotrope	94.4	0.23	0.67

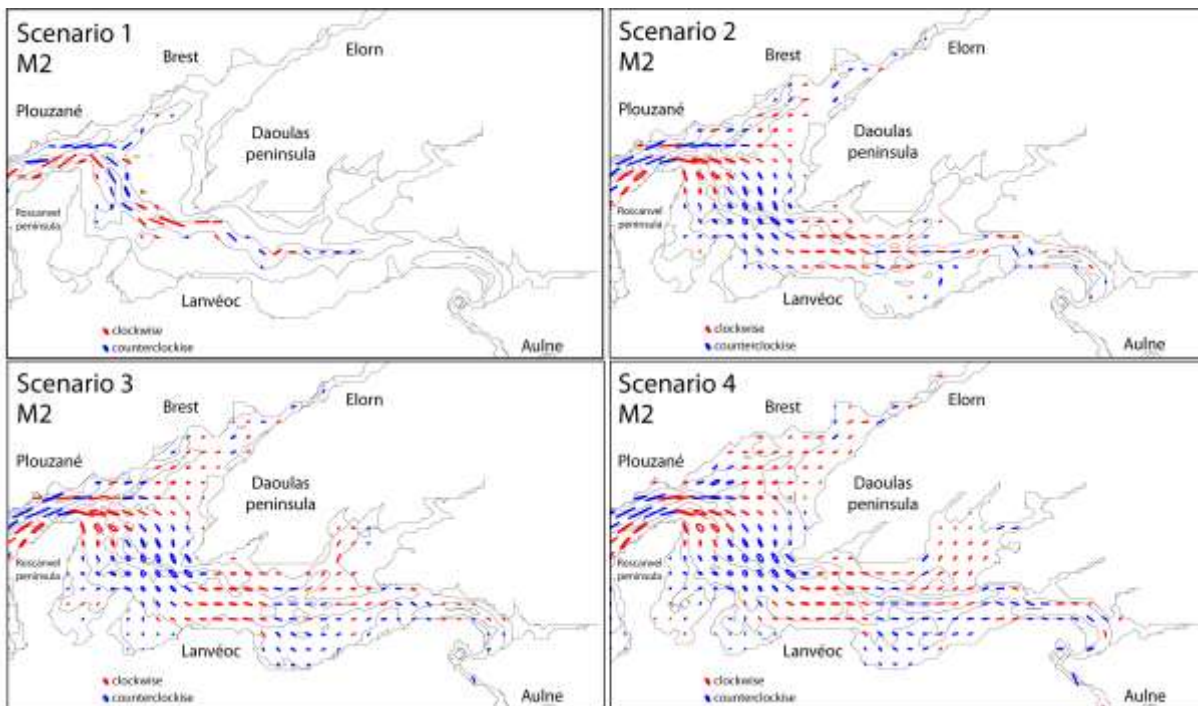
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18 The compared points reveal very slightly better values for the configuration with a spatialized
 19 roughness length. This justifies the simplification of the approach and the use of a uniform roughness
 20 length to facilitate comparison with past stages.

21

22 **M2 and S2 ellipses:**

23



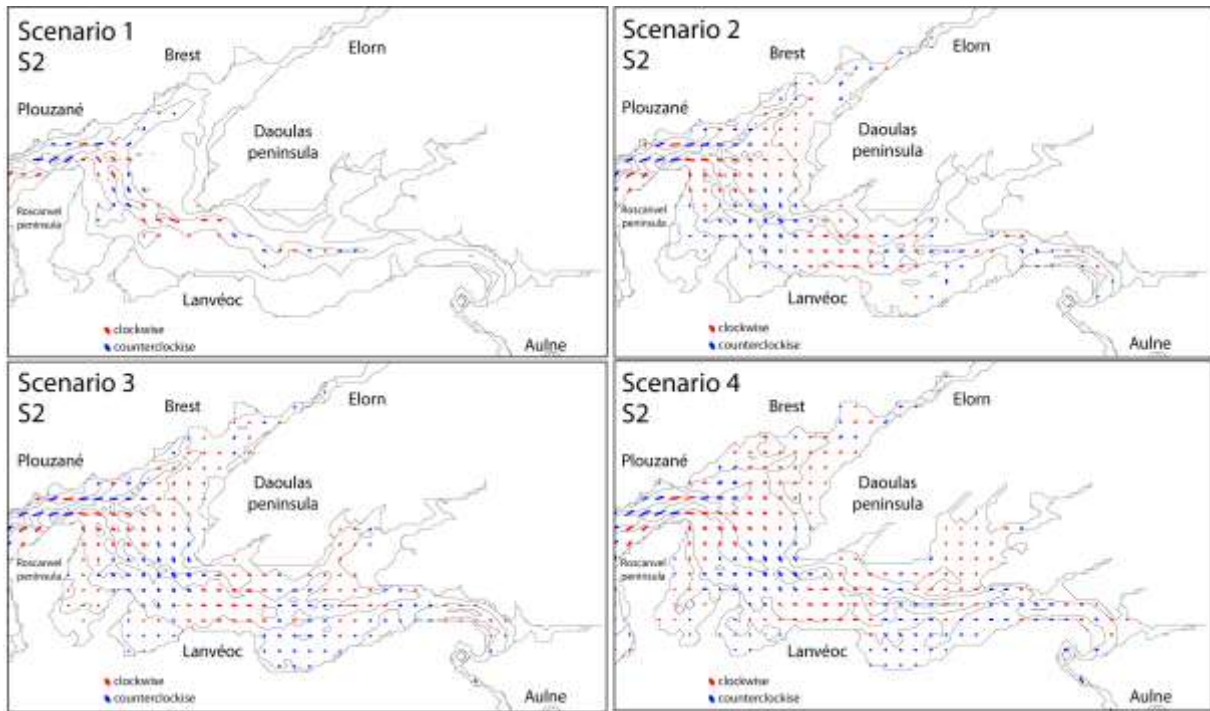
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M2 component ellipses for each scenario, calculated from the barotropic currents U and V.



28
29

S2 component ellipses for each scenario, calculated from the barotropic currents U and V.