Investigation of complex coastline geometry impact on the evolution of storm surges along the east coast of India: A sensitivity study using a numerical model

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Figure S1

Table S1

Table S2

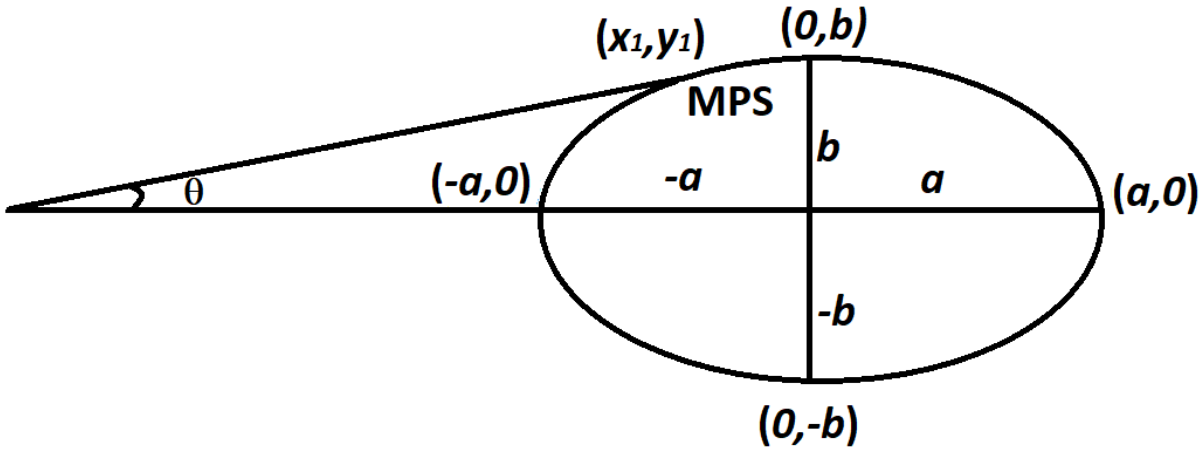

Figure S1. Angle of a tangent (θ) to an ellipse at the point of maximum peak surge (MPS).

Calculation of angles with respect to maximum peak surge (MPS) location based on the shape of the domain: If the shape of the domain is represented by an ellipse, which is given by,

$$\frac{x^2}{a^2}+\frac{y^2}{b^2}=1 \quad (1)$$

where, "*a"* is the semi-major axis and "*b"* is semi-minor axis. If *b* becomes the semi-major axis and *a* becomes the semi-minor axis, the equation remains the same. Then, the equation of a tangent angle to an ellipse is given by:

$$tan\,\theta = -\frac{b^2}{a^2}\frac{x1}{y1} \quad (2)$$

where (x_1, y_1) is any point on the ellipse above the semi-major axis as shown in Fig. S1 and in this case, the angle is positive. Similarly, if a point is considered below the semi-major axis, the corresponding angle will be negative. Tables S1 and S2 provide the angles corresponding to different locations of the maximum peak surge (MPS) generated by the various cyclone tracks and different shapes of the domain considered in this study.

Table S1. Maximum peak surge along with the tangent angle at R_{max} for the different tracks for the concave shape.

Shape (concave)	Track	Angle (degrees)	MPS (m)
CC1	T_2	79.5	3.56
	T_1	82.7	3.59
	T_0	86.8	3.61
	T_{-1}	90.0	3.63
	T_{-2}	-87.0	3.62
CC2	T_2	70.2	3.49
	T_1	76.2	3.56
	T_0	84.0	3.63
	T_{-1}	90.0	3.64
	T_{-2}	-84.4	3.64
CC3	T_2	62.0	3.36
	T_1	70.4	3.49
	T_0	81.2	3.63
	T_{-1}	90.0	3.66
	T_{-2}	-81.6	3.65
CC4	T_2	57.3	3.23
	T_1	64.7	3.39
	T_0	78.7	3.64
	T_{-1}	90.0	3.67
	T_{-2}	-79.0	3.67
CC5	T_2	53.2	3.09
	T_1	60.0	3.30
	T_0	76.3	3.60
	T_{-1}	90.0	3.68
	T_{-2}	-76.1	3.65
CC6	T_2	49.2	2.96
	T_1	55.3	3.21
	T_0	74.0	3.60
	T_{-1}	90.0	3.70
	T_{-2}	-74.5	3.64

Table S2. Maximum peak surge along with the tangent angle at R_{max} for the different tracks for the convex shape.

Shape (convex)	Track	Angle (degrees)	MPS (m)
CV1	T_2	79.5	3.53
	T_1	82.7	3.57
	T_0	86.8	3.59
	T_{-1}	90.0	3.59
	T_{-2}	-87.0	3.57
CV2	T_2	70.2	3.36
	T_1	76.2	3.47
	T_0	84.0	3.56
	T_{-1}	90.0	3.57
	T_{-2}	-84.4	3.54
CV3	T_2	62.0	3.17
	T_1	70.4	3.36
	T_0	81.2	3.51
	T_{-1}	90.0	3.54
	T_{-2}	-81.6	3.51
CV4	T_2	57.3	2.96
	T_1	64.7	3.25
	T_0	78.7	3.46
	T_{-1}	90.0	3.53
	T_{-2}	-79.0	3.45
CV5	T_2	53.2	2.81
	T_1	60.0	3.11
	T_0	76.3	3.40
	T_{-1}	90.0	3.52
	T_{-2}	-76.1	3.39
CV6	T_2	49.2	2.71
	T_1	55.3	3.05
	T_0	74.0	3.38
	T_{-1}	90.0	3.48
	T_{-2}	-74.5	3.38