

[Home](#) > [Journal](#) > [Earth & Environmental Sciences](#) > [IJG](#)
[Indexing](#) | [View Papers](#) | [Aims & Scope](#) | [Editorial Board](#) | [Guideline](#) | [Article Processing Charges](#)
[IJG](#) > Vol.2 No.1, February 2011



Inundation Maps for Extreme Flood Events at the Mouth of the Danube River

PDF (Size: 641KB) PP. 68-74 DOI: 10.4236/ijg.2011.21007

Author(s)

Daniela E. Nistoran Gogoase, Iuliana Armaş, Cristina S. Ionescu

ABSTRACT

Hydrodynamic modeling is used to analyse the inundation behavior of St. George village during extreme flood events, in particular for a flood happened in spring 2006. The study reach, 4 km in length, is situated in the Danube Delta, at the mouth of St. George distributary and includes St. George village. Land and bathymetric surveys were used to create a digital terrain model (DTM) of the river channel and the village. By coupling the geometry with hydrologic data, a 2D hydrodynamic model was built up with the help of the CCHE2D code (University of Mississippi). The model is based on integrating Saint-Venant shallow waters (depth averaged) equations through finite-difference implicit numerical scheme. It was calibrated in terms of roughness coefficients on measured values of water surface elevation registered in the St. George port. Flood maps obtained from computations were compared to satellite images from the same days of the spring 2006 extreme event. Inundation behaviour of the St. George village was analysed for different scenarios of river hydrological and sea level (variable because of wind waves) conditions. Findings were compared with high water marks and inhabitants testimonials. The model proved that sea level has a higher influence upon the inundability of the area than the river flood events.

KEYWORDS

Hydraulic Modeling, Finite Difference Method, Flood, Inundation Maps

Cite this paper

D. Gogoase, I. Armaş and C. Ionescu, "Inundation Maps for Extreme Flood Events at the Mouth of the Danube River," *International Journal of Geosciences*, Vol. 2 No. 1, 2011, pp. 68-74. doi: 10.4236/ijg.2011.21007.

References

- [1] M. S. Horrit and P. D. Bates, " Evaluation Of 1D and 2D Numerical Models for Predicting River Flood Inundation," *Journal of Hydrology*, Vol. 268, No. 40269, 2002, pp. 87-99. doi:10.1016/S0022-1694(02)00121-X
- [2] K. Marks and P. D. Bates, " Integration of High-Resolution Topographic Data with Floodplain Flow Models," *Hydrological Processes*, Vol. 14, No. 11, 2000, pp. 2109-2122. doi:10.1002/1099-1085(20000815/30)14:11/12<2109::AID-HYP58>3.0.CO;2-1
- [3] R. B. Jacobson and D. L. Galat, " Flow and Form in Rehabilitation of Large-River Ecosystems: An Example from the Lower Missouri River," *Geomorphology*, Vol. 77, No. 3-4, 2006, pp. 249-269. doi: 10.1016/j.geomorph.2006.01.014
- [4] M. S. Horritt, " Calibration of a Two-Dimensional Finite Element Flood Flow Model Using Satellite Radar Imagery," *Water Resources Research*, Vol. 36, No. 11, 2000, pp. 3279-3291. doi:10.1029/2000WR900206
- [5] J. R. French, " Airborne Lidar in Support of Geomorphologic and Hydraulic Modelling," *Earth Surface Processes and Landforms*, Vol. 28, No. 3, 2003, pp. 321-335. doi: 10.1002/esp.484
- [6] V. Malciu and V. Diaconu, " Long-Term Trend of the Sea Level at the Romanian Littoral," *IOC Workshop Report*, No. 171, Annex III, 2007.

- [Open Special Issues](#)
- [Published Special Issues](#)
- [Special Issues Guideline](#)

[IJG Subscription](#)
[Most popular papers in IJG](#)
[About IJG News](#)
[Frequently Asked Questions](#)
[Recommend to Peers](#)
[Recommend to Library](#)
[Contact Us](#)

Downloads:	165,241
------------	---------

Visits:	393,449
---------	---------

[Sponsors, Associates, and Links >>](#)

- [7] C. Bondar, I. State and V. Roventa, " Marea Neagr? ?n Zona Litoralului Romanesc. Monografie Hidrologic?," Bucuresti, IMH, 1973.
- [8] C. Bondar and N. Panin, " The Danube Delta Hydrologic Database and Modelling," Geo-Eco-Marina, Vol. 5, No. 6, 2000, pp. 5-52.