Bathymetry of the Hong and Luoc River Junction, Red River Delta, Vietnam, 2010

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Red River Delta boundary

EXPLANATION

CHINA

0

100 MILES

Delta

Trieu Duong tide gage on the Luoc River near Trieu Duong tide gage. Photograph by Yasuyuki Shimizu, 2010.

Description of Study Area

The Hong and Luoc Rivers are two distributaries of the Red River Delta, located in Vietnam. The survey site is in Hung Yen Province near the city of Hung Yen located approximately 50 km southeast of Hanoi, the capital of Vietnam. The Red River Delta is the second largest delta in the world and is composed of a vast network of channels, estuaries, and tidal flats. The surveyed area includes the junction of the Hong and Luoc Rivers, which together flow into the Gulf of Tonkin. The flow in the Luoc River can be influenced by the pattern of streamflow in the Red River. The survey was done to characterize the channel morphology of this delta distributary network and provide information for further management and planning purposes.


determination of the precise pitch, roll, and yaw angle (yaw is defined as the deviation with respect to the axis of the boat along the keel) between sonar surveys. This process is referred to as a patch test. The angular offsets measured for pitch, roll, and yaw angles were determined and used to maintain consistent reflections from the bottom.

The survey was corrected for the tidal influence measured at the Trieu Duong tide gage on the Luoc River. Since the speed of sound varies with water temperature, pressure, and salinity, and this speed is used in the sonar ray-bending calculations, careful consideration must be given to the correction of tidal effects during the survey. In this study, the tidal effect was accounted for by using the tidal data from Trieu Duong tide gage. The height of the surveys was referenced to a water level measured at the tide gage.

The survey matrices can be imported into HYDROGRAPHIC SURVEY SOFTWARE (HYSS) for processing and analysis. HYSS is a powerful software application that allows users to import survey data and export to GIS and vector formats. HYSS provides an environment for hydrographic surveyors to perform data processing and analysis, generating products such as contour, depth, and bathymetric maps. The survey data can also be exported to other software applications for further processing and analysis.

Survey Data

The survey data consists of bathymetric points collected in the study area. Each point is the center of the grid cell. Figure 2 shows the distribution of soundings that were taken in the surveyed area. The bathymetric points collected in the study area were then resampled to a 5 × 5 m grid. Each point in the resampled grid represents an average of the surrounding bathymetric points.

The survey was produced from the surveyed data in a geographic projection and was referenced to the zero datum line of the datum used for the survey. The datum used for the survey was the New York City Datum (NYCD), which is based on the mean sea level at the New York City Harbor. The survey was also referenced to the zero datum line of the datum used for the survey area, which is the zero datum line for the Red River Delta.

The survey was produced to scale and includes a bathymetric map of the surveyed area. The map shows the depth contours and the shape of the river channels. The map was produced using HYDROGRAPHIC SURVEY SOFTWARE (HYSS) and was referenced to the zero datum line of the datum used for the survey. The map includes a legend and scale bar indicating the depth contours and the shape of the river channels.