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The Use of HYPACK® in Environmental and Dredging Studies in Laguna da Jansen – Ma

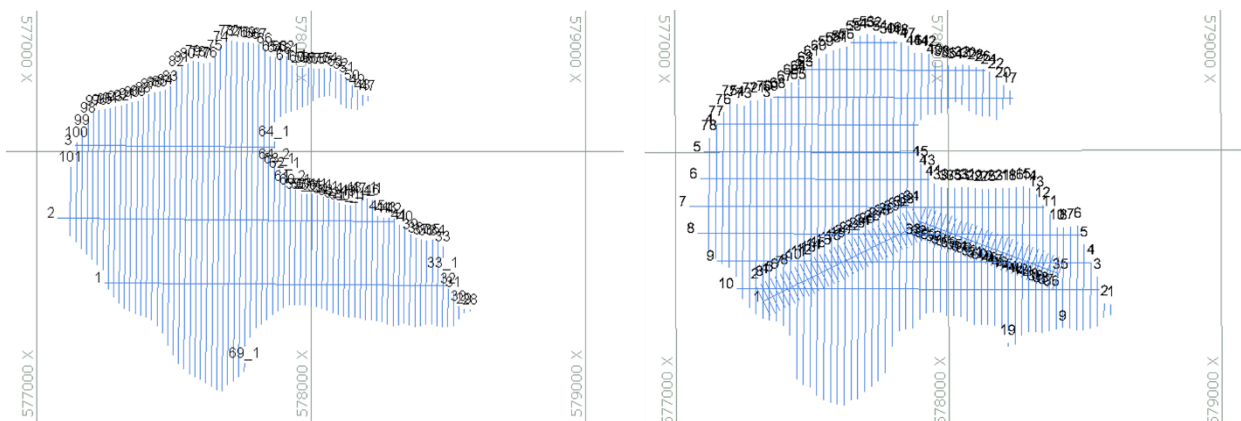
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In the years 2019 and 2020 two bathymetric surveys were performed in Laguna da Jansen, São Luis, Brasil, with assistance of software HYPACK®. It was possible to obtain the necessary data for Academic research of dredging projects and sedimentation studies with a single beam system and tide observations logged simultaneously to the data. Both surveys used the same equipment and methodology for the data collection.

All of the stages of the bathymetric survey— path planning, data collection and data processing— were executed using HYPACK®. In 2019, the regular survey lines were spaced at 20 meter intervals. Meanwhile, the the check lines had 200 meter spacing. In 2020, the line spacing changed, becoming 25 meters and 100 meters, respectively. Also, in this last one, a channel was surveyed planned lines equidistantly spaced at 25 meters.

Figure 1 – Path Planning 2019 (left) and 2020 (right).

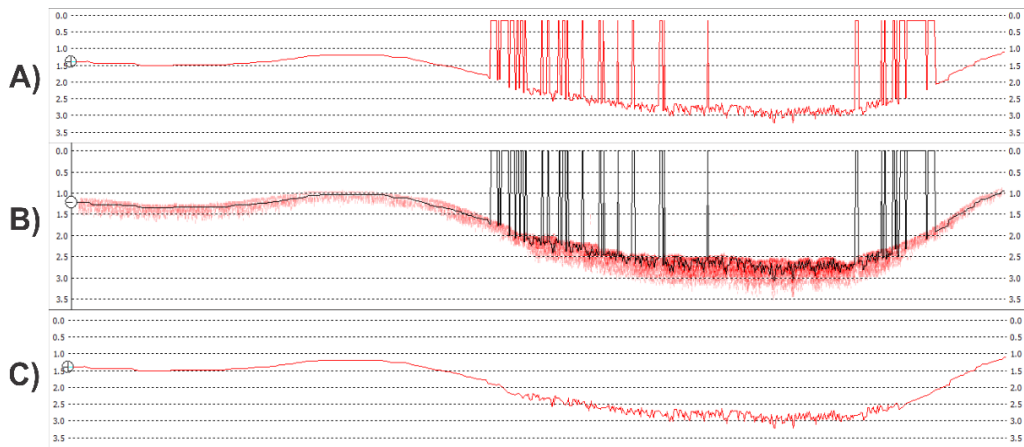


The devices that were used on the surveys were the Echoboat ASV from Seafloor, an Atlas Link DGPS receiver from Hemisphere and a single beam, CV100 echosounder from Teledyne. Initially, in both years, a latency test was made.

To adjust for the sound velocity changes in the water column, a bar check was used in 2019. In 2020, a sound velocity profiler collected data to generate a sound velocity corrections file used for the same purpose.

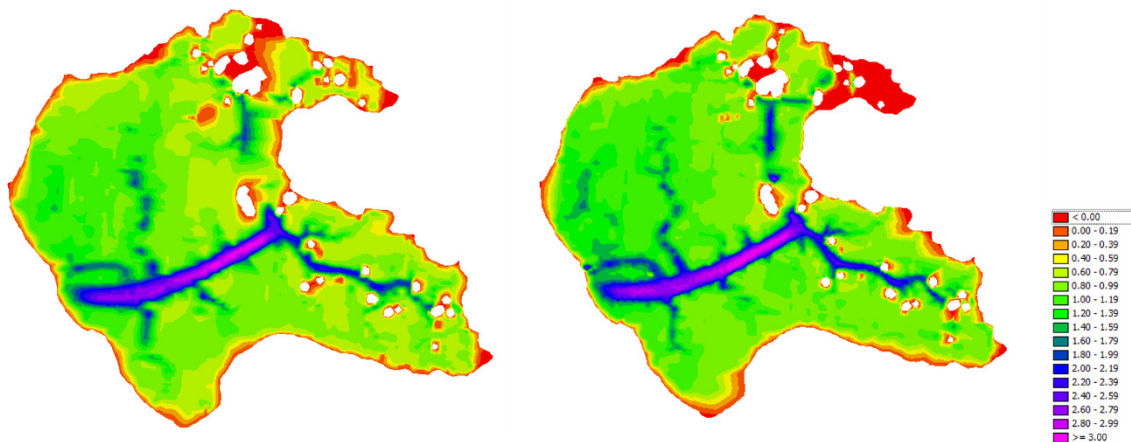
For the bathymetric data processing, once again, used HYPACK®. With the observations, it was possible to correct for the tides, adjusting the variation of the water level during the period of the sounding collection. It also made corrections for the sound velocity in water. Each surveyed session was analyzed to eliminate spurious data and fill positioning gaps.

Figure 2 – Processing of each session.



When processing the survey data was finished, the TIN MODEL (Triangulated Irregular Network) program generated digital models of the reservoir depths for each year.

Figure 3 – Depth Digital Models of Laguna da Jansen in 2019 X 2020.



After water level corrections, referencing both surveys to the medium level of the lagoon, it was possible to compare the volumes that were found in each one of them and analyze the changes that occurred to the submerged survey surface.

Figure 4 – 2019 vs 2020.

By comparing these surface models, the sedimentation movement of the reservoir was noted. Positive values (hot colors) indicate the sedimentation, while negative values (cold colors) evidentiate possible erosions.

