Comparison of PPK-GPSTide and Zoned Verified Tides

Tidal corrections for this survey were done using PPK-GPS derived altitudes which were reduced to MLLW using VDatum grids and the CARIS HIPS GPSTide function. Since conventional tidal data and zones were available, gross error and reality check comparisons were done between data corrected using both methods. The following tests were performed:

1. For a snapshot of general agreement throughout the survey area, a copy of the crossline data was corrected using zoned, verified smoothed tides, and dynamic draft correctors applied. QC reports were then generated in HIPS for these "tidal" crosslines versus the BASE surfaces (GPSTide method) in the same manner described in the crossline comparison section above.

   Results: All "tidal" beams passed at 95 % or better as compared to the BASE surfaces. Results are available in Separate IV.[5]

2. In order to identify and quantify any static offsets between the two processing methods, a difference surface was created in IVS Fledermaus using a CUBE surface created from the crosslines and a CUBE surface created from the same crosslines corrected using zoned, verified smooth tides. (Difference surface = tidal surface minus GPSTide surface, both 4m resolution)

   Results: Average difference was -0.151 m, median difference was -0.158 m, with a standard deviation of 0.067 m. Therefore, the GPSTide surface was about 15 cm shoaler on average. No significant trends were apparent though the difference is slightly greater south of Pt Arguello versus north of Pt Arguello. This may be because the in-use tide gauge for the area for the tidal crosslines was Port San Luis (9412110) which is north of the point, or it may simply be because the crosslines were run at different times (north set

run about 30 hours after the southern set).

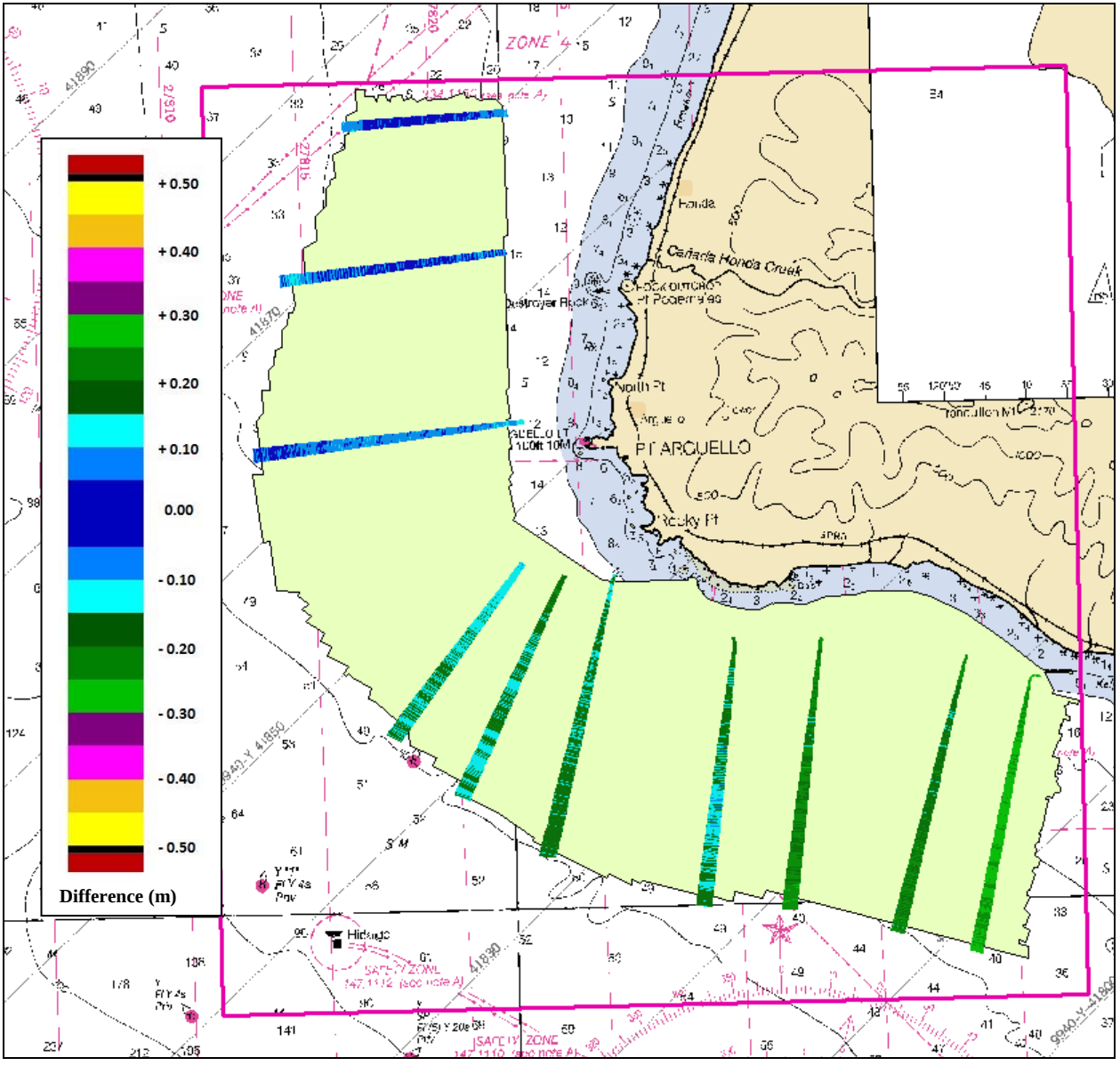

Figure 4 H11953 Difference Surface – Tidal minus GPSTide

In conclusion, absolute correctness of one source of tidal correction over the other cannot be determined by direct comparisons between the two data sets. However, data corrected using both methods statistically compares very well to each other, and qualitatively the matchup between adjacent lines is good using both methods. Therefore, for this survey, the GPSTide method of tidal correction meets specification and is an acceptable alternative to the standard tidal method.[6]

Vertical Control

All sounding data were initially reduced to MLLW using predicted tidal data from the Gaviota Pier. Predicted tides were used only for preliminary data cleaning.

Final tidal corrections were generated using PPK processing methods in conjunction with NOAA's VDATUM model and the CARIS GPSTide routine. Applanix POSPac software produced a smoothed best estimate of trajectory (SBET) file that, among other data, contained GPS altitudes based on the NAD83 ellipsoid. The SBET altitudes were loaded in to every line in CARIS HIPS, and HIPS' GPSTide routine then run to compute a GPS-based tide. The GPSTide routine used a VDatum NAD83 to MLLW offset grid to produce MLLW tide correctors. This grid is an XYZ text file and is included with the CARIS data under the tide directory.

See M-L906-KR-08 Horizontal and Vertical Control Report for a more detailed description of the GPSTide methods.