Convex20 glider oxygen data “calibration”

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Index

Introduction

Following the procedure reported in Gerin et al., 2020a, the salinity and pressure compensated oxygen data of the SG554 SeaGlider was calibrated considering the 6903250 float dissolved oxygen data previously calibrated using Winkler samples (Gerin et al., 2020b). All the profiles were recorded in the Southern Adriatic Pit during summer 2020 (Convex20 glider mission: 12 June - 02 July 2020).

During June 2020 we selected two profiles of float 6903250 which were close in time and space to the glider data (Fig.1 and Table 1). The first profile was collected on 15/06/2020 about 20 km apart from the glider surfacing. The second float profile was collected on 20/06/2020 at 11:39 while the glider surfacing occurred on 19/06/2020 at 23:06, about 17 Km apart from float profile.

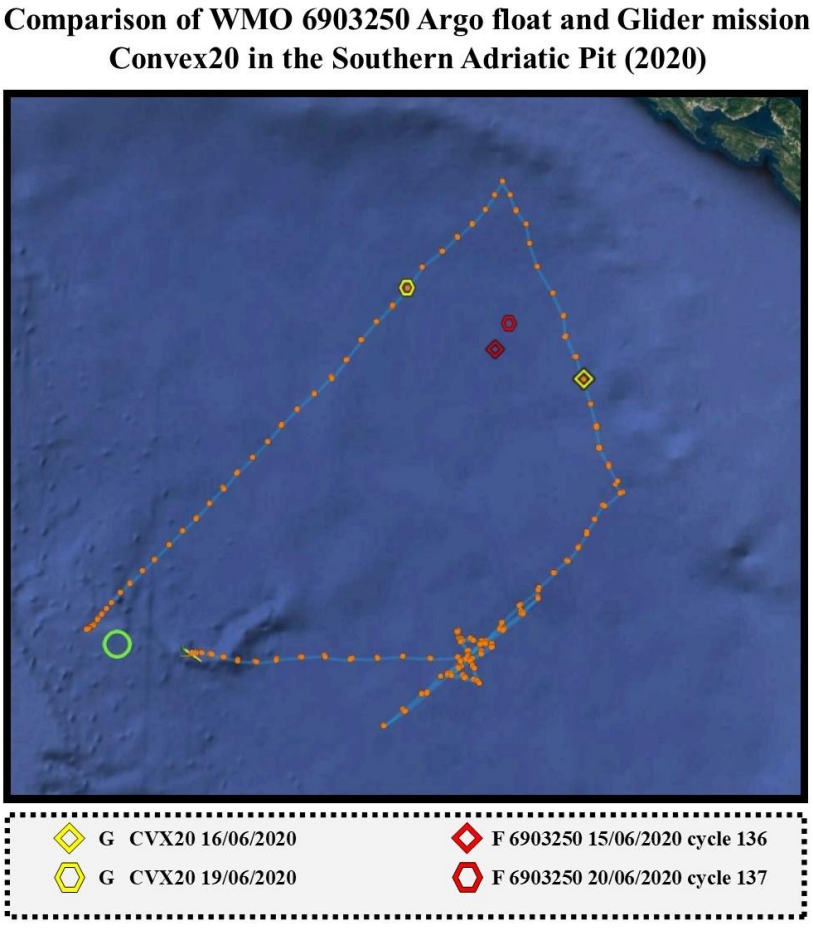

Fig. 1: Location of the glider surfacings and the float profiles used in the comparison of all the cases selected in Table 1. Symbols in yellow and red represent the glider surfacings and the float profiles, respectively. The compared glider-float profiles are represented with common symbols. The legend reports the glider mission names (shortened: CVX 20 stays for Convex20) and the time and the float WMO number, the time and the float cycle number.

Float						Glider						Distance	
WMO	Cycle	Date	Time	Latitude	Longitude	Mission	id	Date	Time	Latitude	Longitude	Km	hours
6903250	136	15/06/2020	11:40	42.039	18.055	Convex 20	554	16/06/2020	16:50	42.084985	17.78903167	20	30
6903250	137	20/06/2020	11:39	42.083	18.085	Convex20	554	19/06/2020	23:06	42.062215	18.21303833	17	12

Table 1: Float WMO, cycle number, date, time and position and glider mission, ID, date, time and position used in the comparison. Time and distance gaps between the selected profiles are also indicated.

Float oxygen calibration

A qualitative comparison of the float and glider data of the selected cases evidenced a good agreement of the profile shapes. The gaps between the glider-float profiles are of about 0.5 ml/l (Fig. 2).

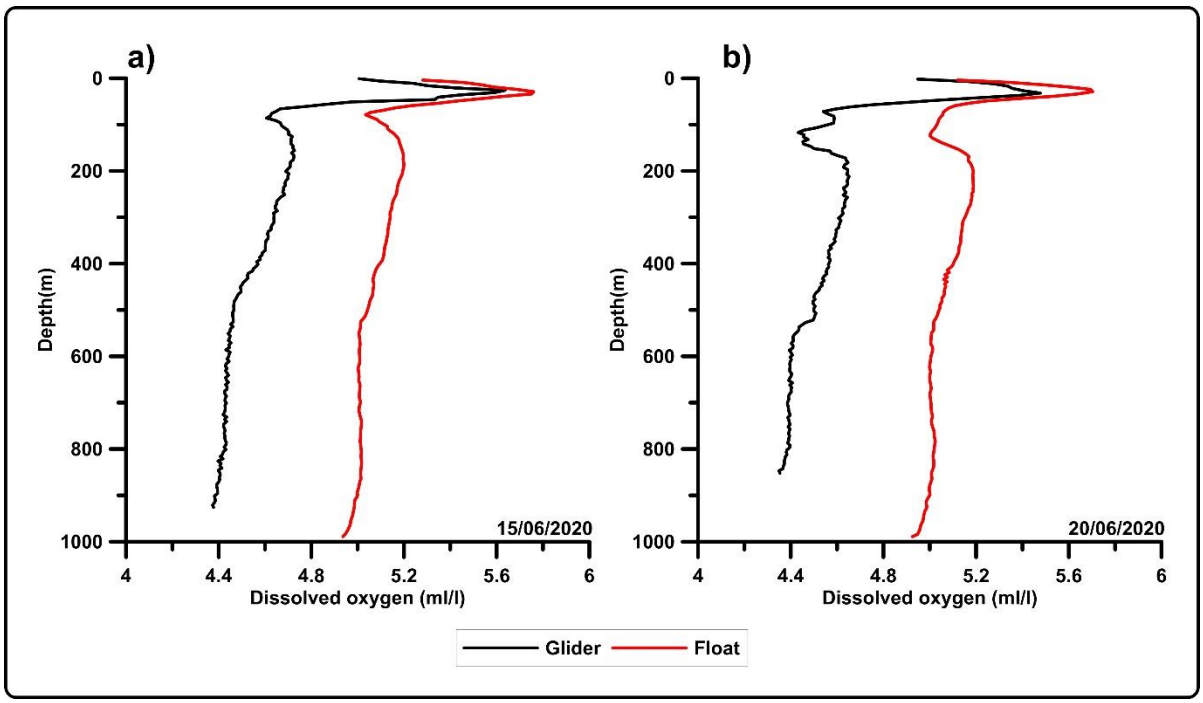

Fig. 2: Comparison between glider (black line) and float (red line) oxygen profiles for the selected profiles (see Table 1)

The oxygen data minimization (Fig.3) displays a coefficient of determination of 0.68 and A coefficient A equal to 0.557 ml/l

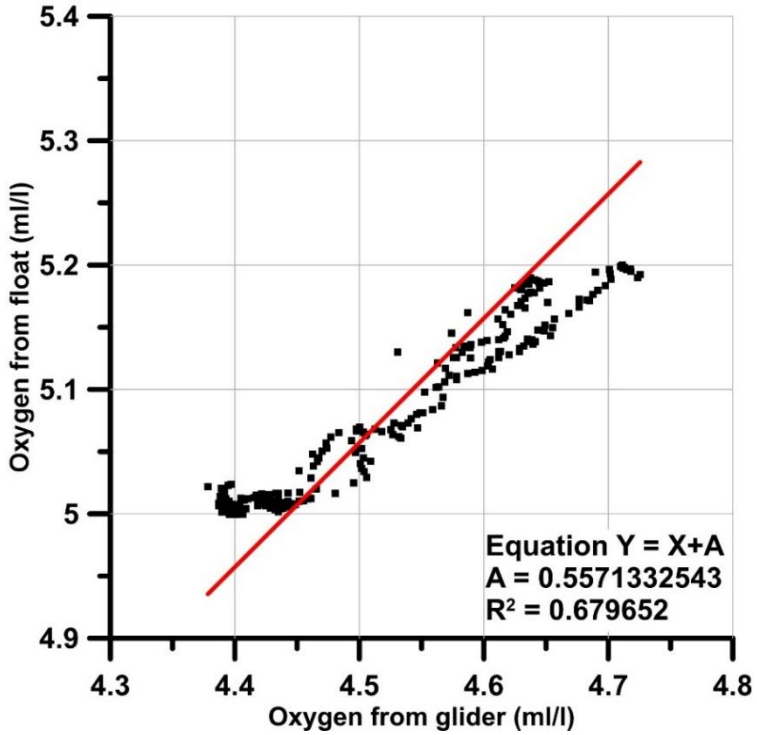

Fig. 3: Least square minimization between the compensated oxygen glider data and the float data. In the legend the A coefficient and the coefficient of determination are reported.

Comparison between previous glider oxygen data calibration and Convex20 calibration

The SG554 oxygen sensor was previously calibrated during Preconvex 20 glider survey (November 2019; see Gerin et al 2020a) The obtained coefficient of determination and the A coefficient were equal to 0.75 and 0.5028 ml/l, respectively.

The difference between the two calibrations is about 0.05 ml/l, representing an increment of about 0.086 ml/l per years. This drift is perfectly in line with the one obtained for the glider 403 oxygen sensor (Gerin et, al. 2020a), that shows an annual drift of 0.088 ml/l.

References

Gerin R., Martellucci R., Mauri E., Kokkini Z., Medeot N., Nair R., Zuppelli P., Comici C. and Pachou A. (2020a) Oxygen concentration in the South Adriatic Sea: the gliders measurements. 2020/36 OCE 9 MAOS, Trieste, Italy, 31 pp.

Gerin R., Martellucci R., Notarstefano G. and Mauri E. (2020b). Float oxygen data calibration with discrete Winkler samples in the South Adriatic Sea. REL. 2020/30 OCE 9 MAOS, Trieste, Italy, 21 pp.