On the use of the In Situ Analysis System (ISAS) to detect TNPD micro-leaker floats

V. Thierry, M. Le Steun, F. Gaillard

Laboratoire de Physique des Océans
UMR 6523 CNRS Ifremer IRD UBO
Impact of an uncorrected negative pressure drift

- -50 db offset
- Saline bias at depth due to $S=f(T,P,\text{cond})$
- Cold anomaly enhanced in strong thermocline area
- $S$ bias in halocline areas

![Graphs showing original and biased profiles.](image)
The In Situ Analysis System (ISAS) tool

• All available in situ data (Argo, CTD, …) are interpolated on a $\frac{1}{2}^\circ \times \frac{1}{2}^\circ$ regular grid on standard levels
• Monthly WOA2005 as the reference field
• 152 standard levels
• 1 analysis per month since 2002
• Profile with QC 1 or 2 are included in the analysis
On the use of ISAS to detect TNPD microleakers

- Comparison between the float profile and the gridded data interpolated at the profile location:
- DATA – GRIDDED FIELD
Test case: float 6900190

• Comparison between the float temperature or salinity profiles and the gridded data interpolated at the profiles location
• Test with a 20 and a 50 dbar pressure drift added
  – no offset for the first cycle
  – 20 or 50dbar offset at the last cycle
Test case - float 6900190: **DATA – GRIDDED FIELD**

**Original data**

**- 20 db drift**

**- 50 db drift**
Test case: float 5900939

- Comparison between the float temperature or salinity profiles and the gridded data interpolated at the profiles location
- Test with a 50 dbar pressure drift added
  - no offset for the first cycle
  - 20 or 50 dbar offset at the last cycle
Test case - float 5900939: DATA – GRIDDED FIELD

Original data

- 50 db drift
Exemple of floats with a known drift
3900345
Comparison to nearby Argo floats

3900345

Except for the saline bias, the pressure offset is not obvious.
Exemple of floats with an unknown drift

5900984
Comparison to nearby Argo floats

5900984

The pressure offset is clearly visible.
Exemple of floats with an unknown drift

4900632

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Comparison to nearby Argo floats

4900632

Except for the saline bias, the pressure offset is not obvious.
Exemple of floats with an unknown drift
1901052
Comparison to nearby Argo floats 1901052

The pressure offset is not obvious.
Is there a pressure sensor drift?
Conclusion

• The ISAS tool can be use as a complementary tool to detect TNPD microleaker
• Plot timeserie of DATA – GRIDDED FIELD at the profile position
  – Saline bias at depth
  – Cold anomaly in the seasonal thermocline
  – Negative pressure anomaly
• Detection of TNPD microleaker
  – As usual, large drifts are detected; smaller drift are difficult to detect;
  – We have to be careful in the interpretation
  – Help identify saline bias due to conductivity sensor from that due to the pressure sensor.
• Suspicious floats have to be excluded of the analysis. This is not always the case.
• Need to check time series of about 500 floats; plots on a webpage?
• Remarks: Some tech files are not up to date