

ROSAME
Technical aspect
&
Special needs

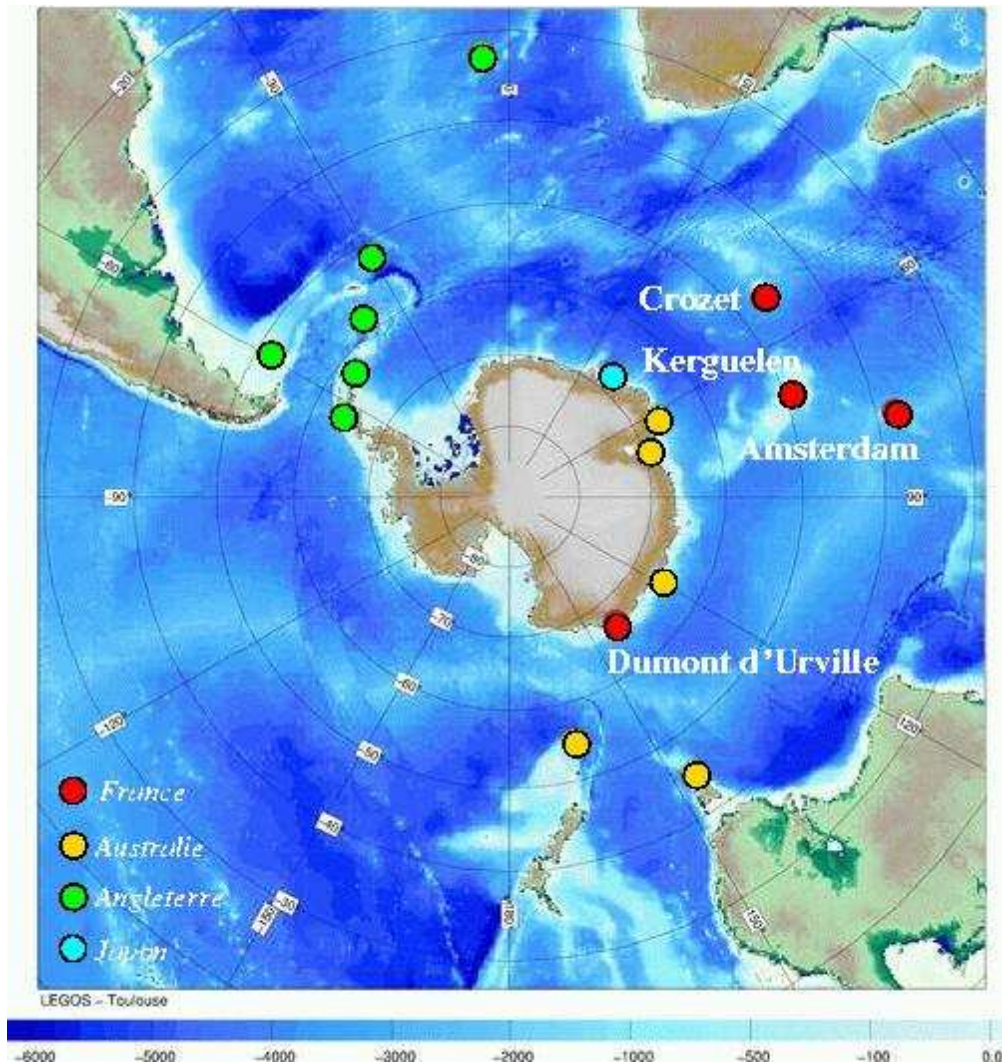
L. Testut, C. Le Provost and P. Téchiné



KERGUELEN ISLANDS Photo: Antoine Guillot (Nivmer 2000)

Réseau d'Observation Sub-Antarctique et Antarctique du niveau de la Mer

Antarctic and South Indian Ocean Tide Gauges Network

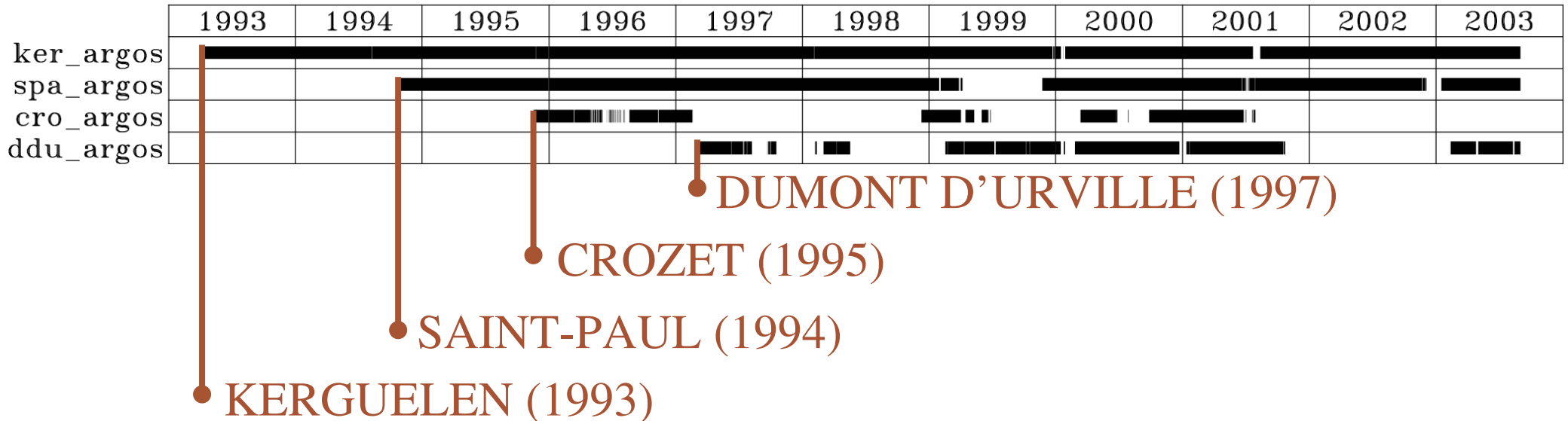


- 4 permanent coastal tides gauges
- 2 moorings (Crozet - Amsterdam)
- Part of the French contribution to GLOSS
- Part of regional networks of monitoring southern ocean
- Scientific objectives
 - Monitor the long term sea level
 - Monitor the ACC (Antarctic Circumpolar Current)
 - Calibrate altimeter

Historic of ROSAME

- Project was initiated by C. Le Provost during the WOCE experiment
- Installation of 4 TG during the 1990's
- Starting NIVMER campaign of maintenance network (+ moorings)

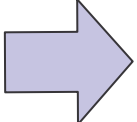
Donnees des maregraphes cotiers du reseau ROSAME au 30/09/2003



Constraints on ROSAME TG network

Geographic location

- No power supply
- No manpower
- How to transmit the data
- How to calibrate your sensor



Hostile Climatic conditions

- Strong wind → mechanical constraint
- Ocean environment → rapid aging of the equipment due to corrosion + big waves
- presence of sea ice → choice of TG type

Logistic

- Time on site is imposed by ocean state
- Difficulty or impossibility to access on site
- Long response time to solve problems

Technics

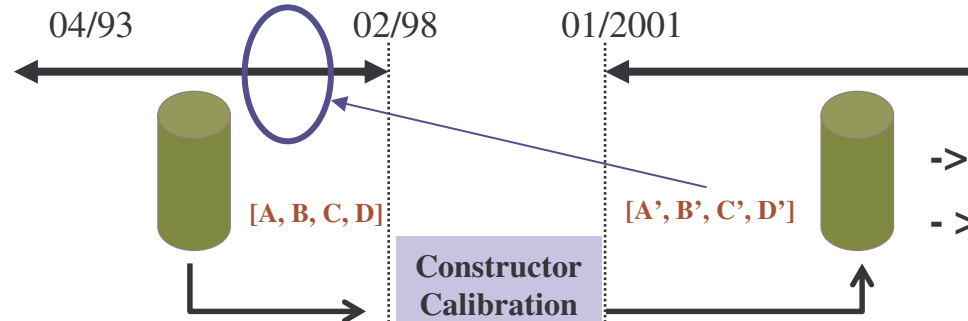
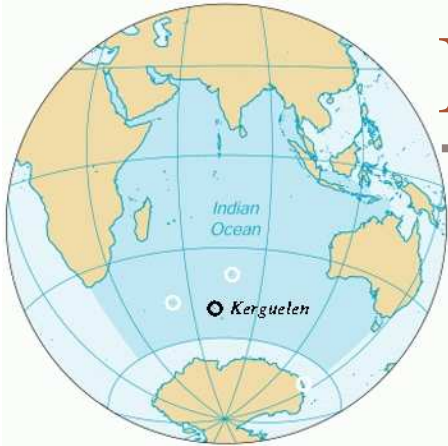
Financial support



Technical Constraints & Solutions

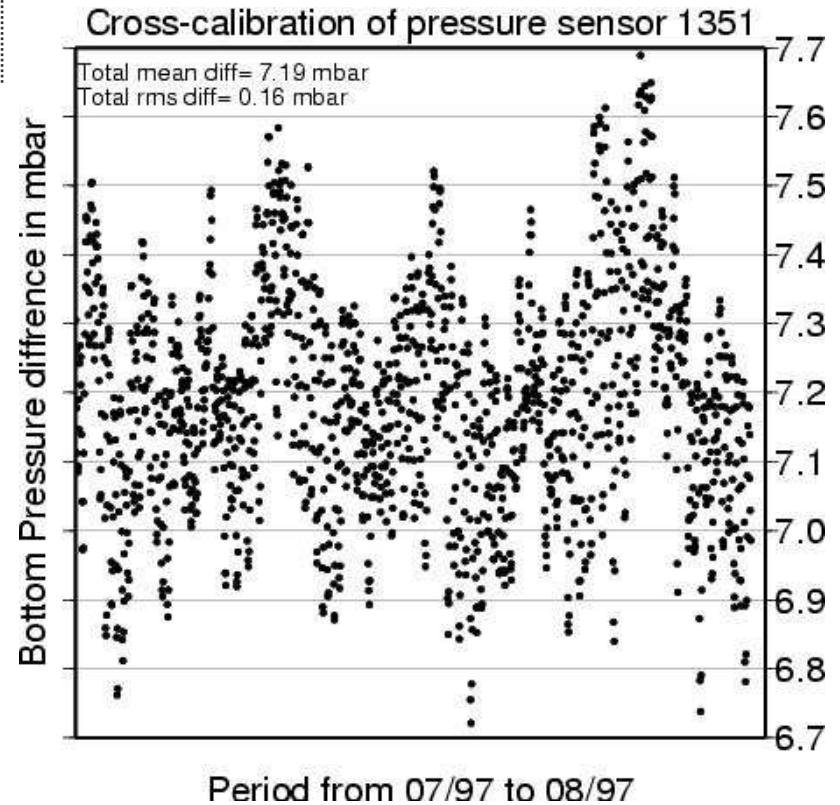
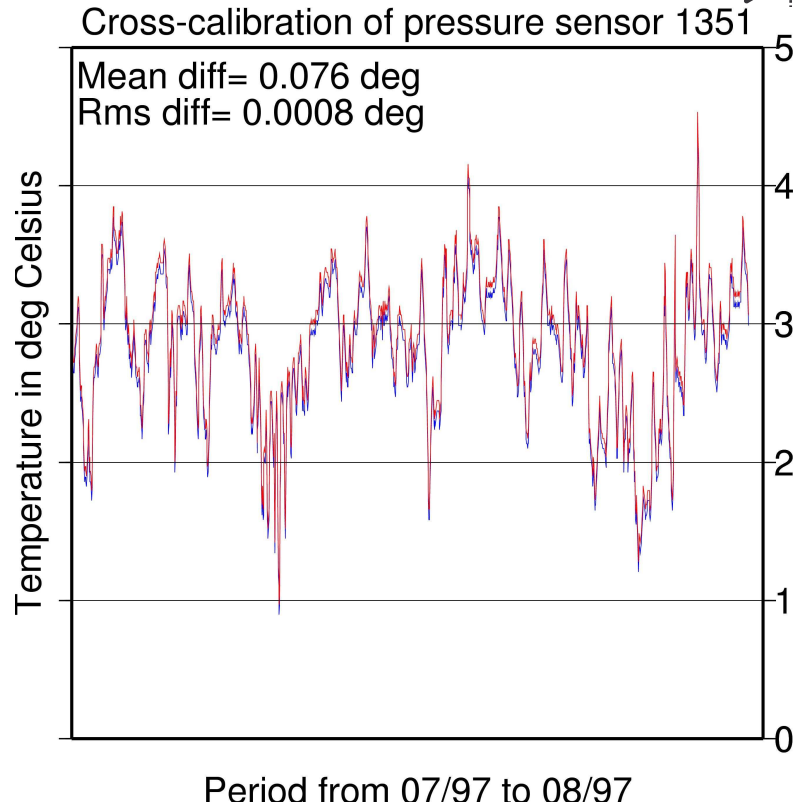
- No power supply
 - Too much wind for wind energy system.
 - Too less sun for solar panel.
- Transmission of data ?
- Harsh environment and strong mechanical constraint due to the wind. Presence of sea ice.
- How to calibrate instruments on site ?
- Stations are alimented by battery (*need low consumption station*)
- Satellite transmission via the argos system (*see P. Téchiné*)
- We have adopted pressure gauge sensor to limit the open-air party of the station. (*it offers very good reliability and accuracy and can be installed under sea ice*)
- ?????

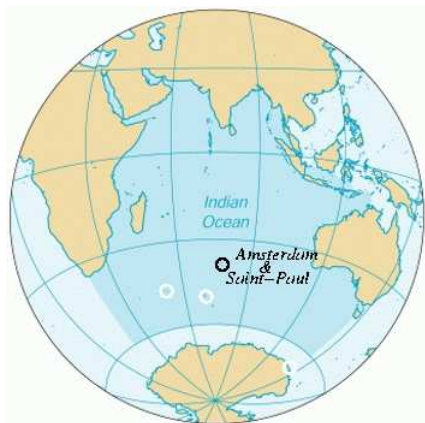
Pressure Gauge drift (Kerguelen)



$$\rightarrow T(^{\circ}\text{C}) = a + bR + cR^2 + dR^3$$

$$\rightarrow \text{Pressure} = A_T + B_T R + C_T R^2 + D_T R^3$$





Saint -Paul

(77°32 E - 38°42 S)

TG: Pressure Gauge

Type: WLR7

Aanderaa

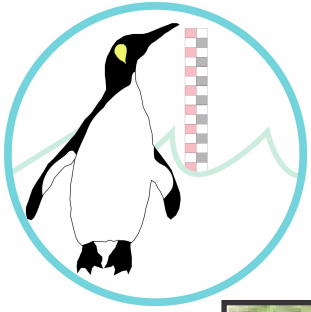
Inst. date: 1994

Time sampling: 1h

Transmission: Argos

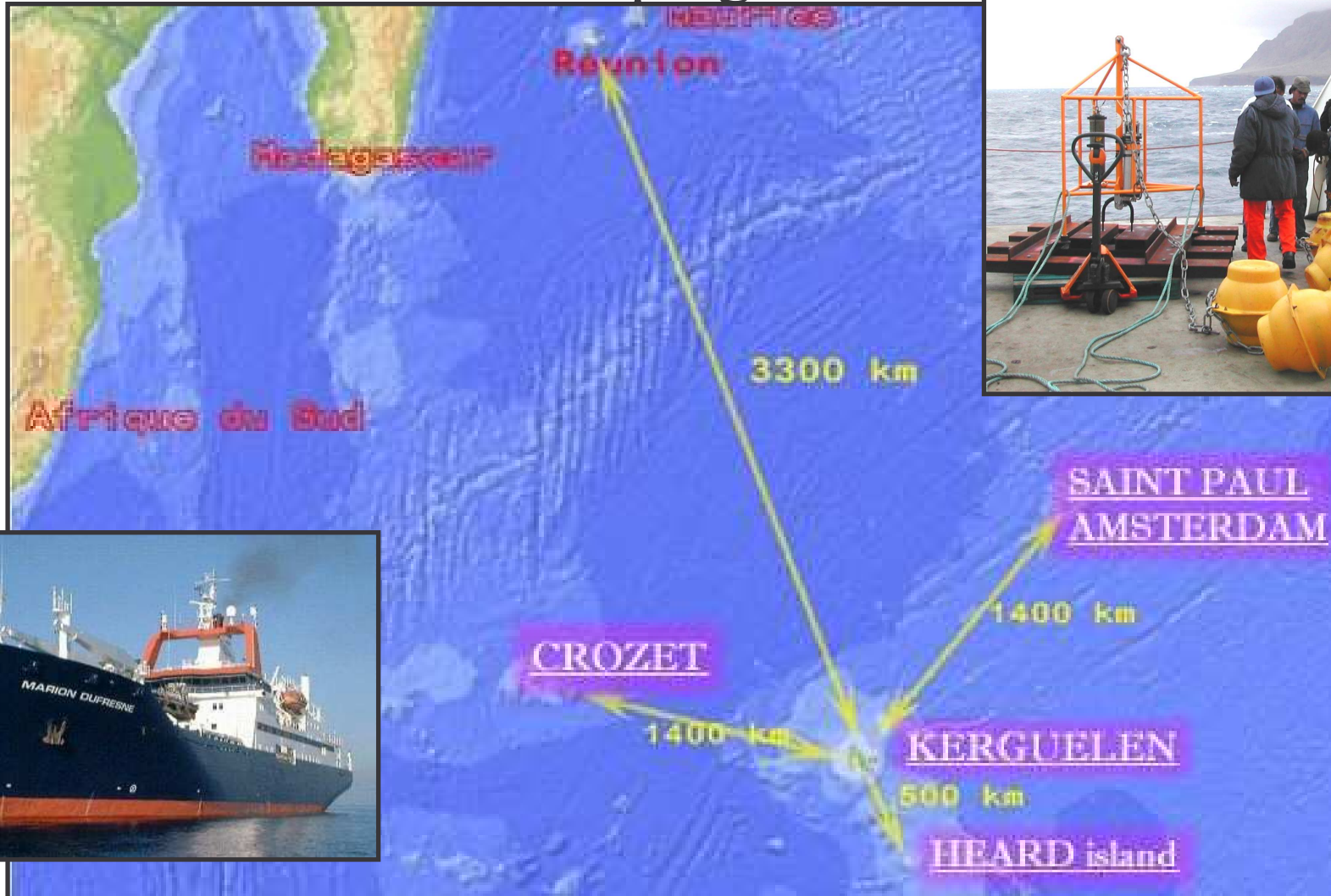
No Scientific base





Logistical Constraints

NIVMER Campaigns

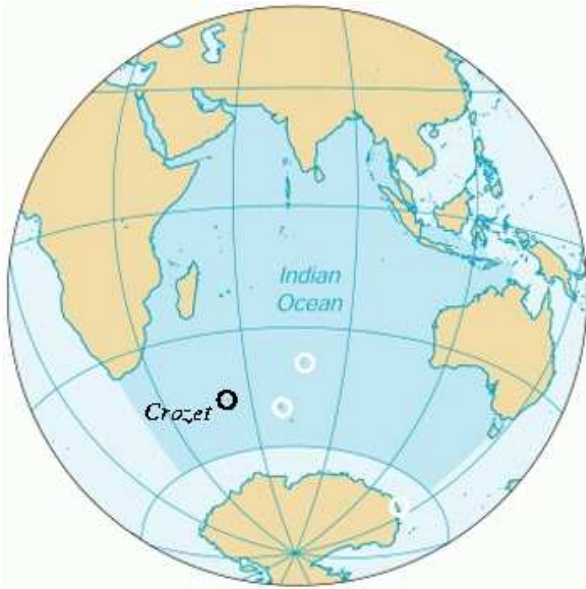


Logistical Constraints

- Only 1 maintenance visit per year for each site during the rotation of the Marion Dufresne vessel. (*It takes 1 month trip for sometimes only few hour on site !*)
- Very little choice of the location for the TG (*must be located near the scientific base, which is not always the best place. ex. location of the Crozet station is an open place subject to strong breaking waves*)
- Very long response time to any situation ! (*ex: Crozet station was destroyed in july 2001 and will be replaced only next December !*)

Crozet

(51°52 E – 46°25 S)



TG: Pressure Gauge

Type:MORS

Inst. date: 1995

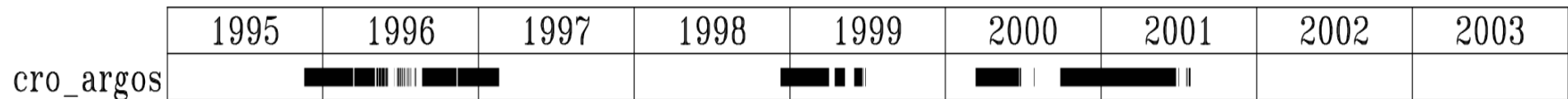
Time sampling:1h

System: Argos

Scientific base



CROZET DATA AT 10/10/2003

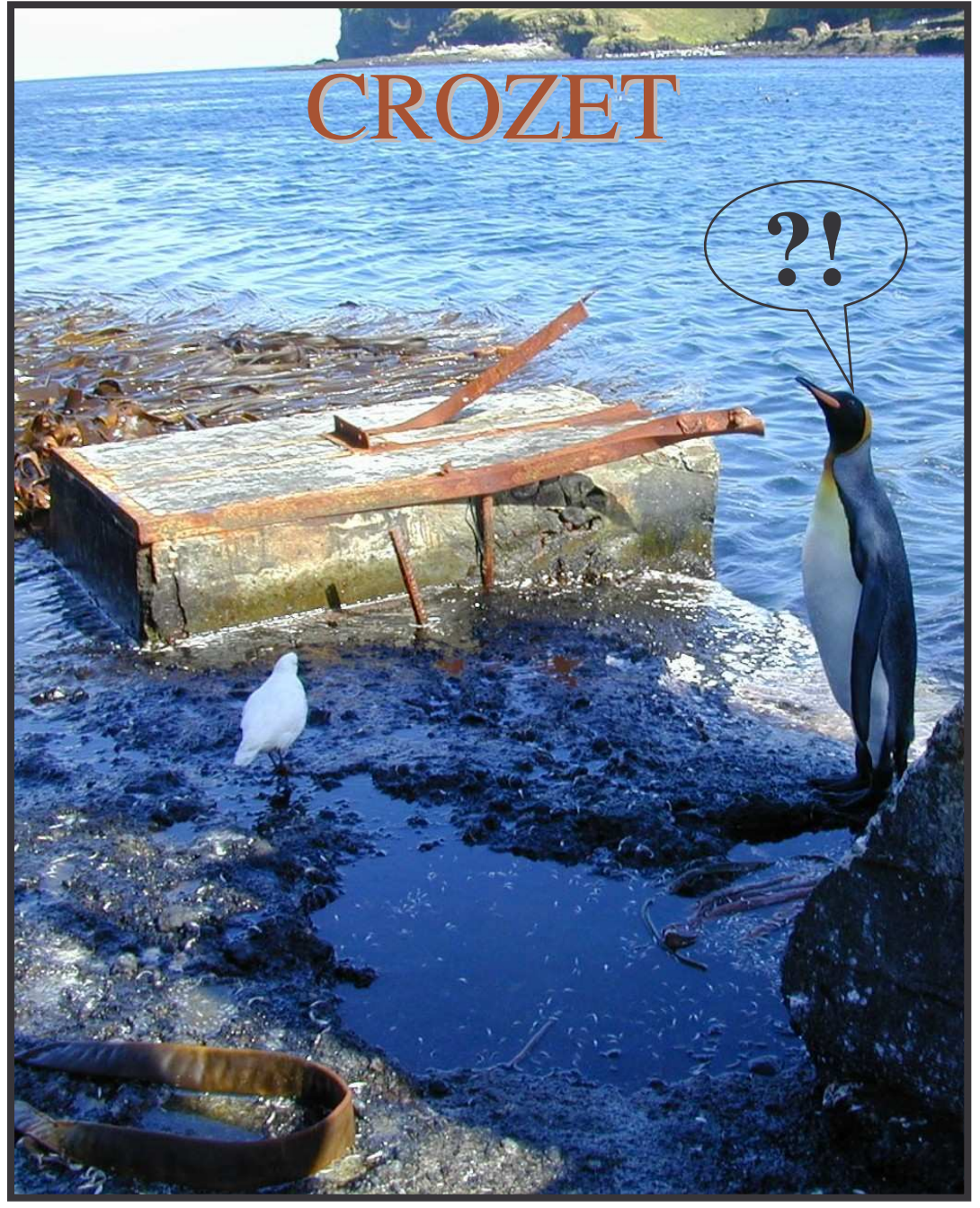




CROZET

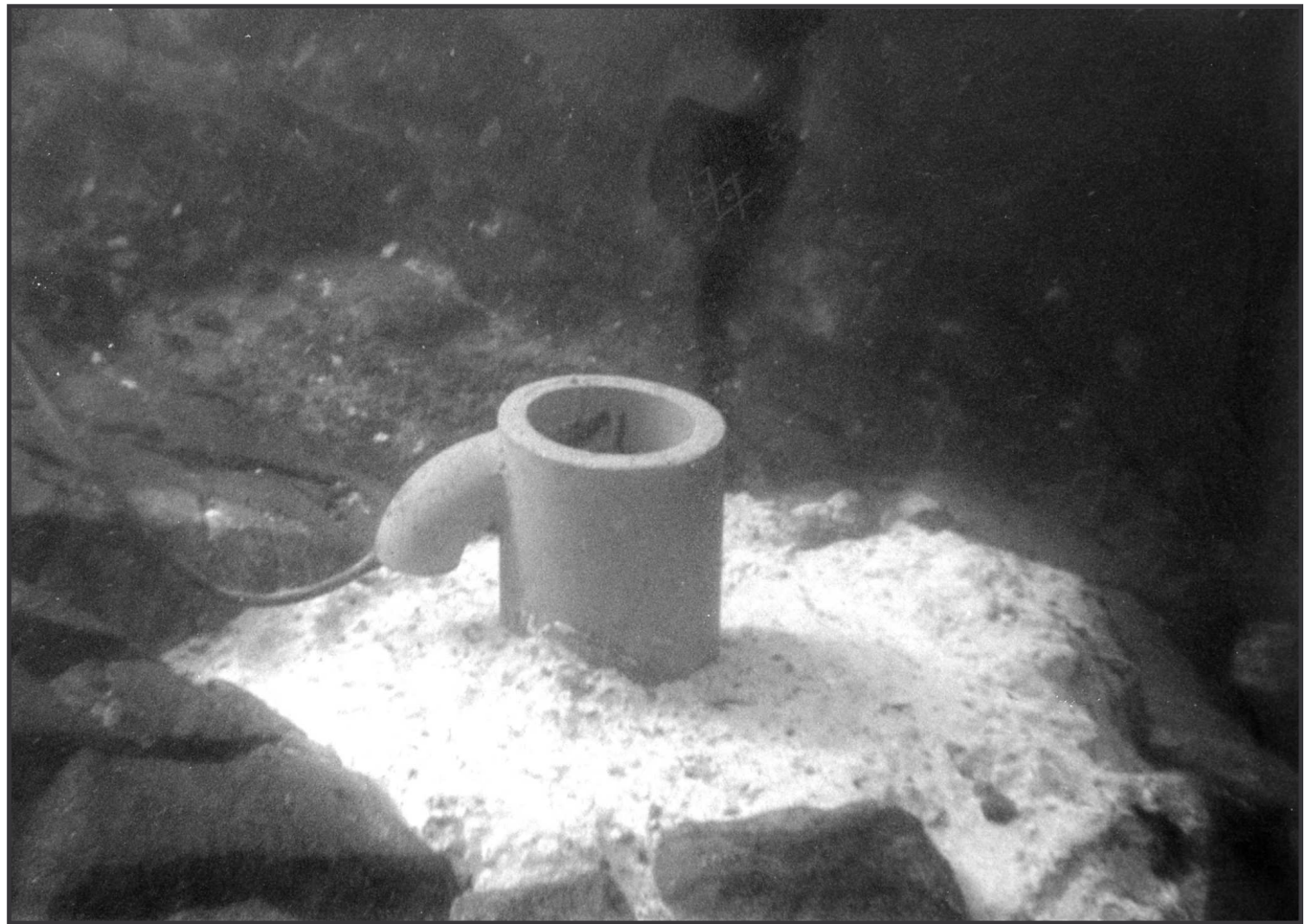


CROZET





Dumont d'Urville *(140° E - 66°39 S)*



TG: Pressure Gauge
Type:MORS
Inst. date: 1997
Time sampling:30min
System: Argos
Scientific base

DUMONT D'URVILLE DATA AT 10/10/2003

	1997	1998	1999	2000	2001	2002	2003
ddu_argos	██████	██████	██████	██████	██████		██████

Conclusion

- Logistic is probably the key factor of a good maintenance of a remote TG network
- Technical problems are in most case not critical and can be overcame (*sometimes with the use of a large amount of money !*)

Special needs

- Monitor the instrumental reference & drift
- We plan to install a permanent GPS near the TG
- We have initiated a levelling program

