



Comparability of oceanic nutrient data: Improving global nutrient comparability through distribution of nutrient CRM's



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Abstract – Nutrients have been measured since the very earliest days of scientific ocean observations, back in the late 19th century. Accordingly, nutrients have a long history of measurement, which thus implies that plenty of data exists worldwide, and if so then it would be a great advantage for studies of ocean climate changes. However, studies on ocean climate changes based on nutrient data have hardly been made. This is because historical nutrients data sets have poor internal and external comparability, i.e., it is difficult to compare data collected by one laboratory with data from a similar oceanic area collected by others. In order to improve this comparability, it is important to analyze nutrients and obtain results that are based on certified nutrient reference material (CRM's). Although a few CRMs for nutrients have been developed and been proved in the past, unfortunately they are not in widespread use. Therefore as an activity of the SCOR Working Group 147 we will aim to distribute a range of different concentrations of CRM's worldwide.

Distribution of CRMs by JAMSTEC – The CRM's will be sold and distributed by JAMSTEC and produced on a commission basis by the General Environmental Technos (KANSO) company in Japan. Previous commercial batches of KANSO CRM's have already been shown to be stable and have been analyzed by many laboratories as part of repeated global inter-comparison studies, and they have been shown to work well in improving analytical comparability. We intend to produce 5 nutrient concentration variations of CRM's (Table 1) to meet requests received from the world ocean community through a questionnaire conducted in 2015.

Table 1. CRMs to be distributed

No.	Level and seawater	Resource seawater	Bottling	Certification
1	Low in Atlantic (Lot. CE)	NIOZ	29 th Oct. 2015	15 th Sep. 2016
2	Middle in Atlantic (Lot. CI)	NOT yet	Not yet fixed	Not yet fixed
3	Middle in Pacific (Lot. CG)	JAMSTEC/Yaizu	21 th Apr. 2016	Jan. 2017
4	High in Pacific (Lot. CF)	JAMSTEC	15 th Dec. 2015	15 th Sep. 2016
5	High in Atlantic (Lot. CH)	NOT yet	Not yet fixed	Not yet fixed

JAMSTEC have already collected 1000 litres of deep Pacific water early in 2016, which will be the source seawater for #3 and #4 CRM production (High and Middle Pacific). The source water was UV sterilized onboard the research ship, and sent back to Japan for autoclaving, checking and bottling on land. The Royal Netherlands Institute of Sea Research, NIOZ, have provided Atlantic surface seawater for #1 CRM (Low Atlantic) production. This has been shipped to Japan and is now also autoclaved and being prepared. For the specific method, see our relevant poster in this cluster: *Comparability of oceanic nutrient data: Methods of certified reference material (CRM) production and certification for reference materials for nutrients in seawater (RMNS) by Kitao et al.*

There is a newly developed sterilization unit which will be sent to Plymouth Marine Laboratory (PML) UK, and the Atlantic High and Middle concentration waters will be collected late 2016 or early next year, and again will be shipped to Japan for autoclaving and processing.

The website for distribution of CRM's will be opened on JAMSTEC's homepage (Fig. 1), making the CRM available for sale and distribution on demand from customers.

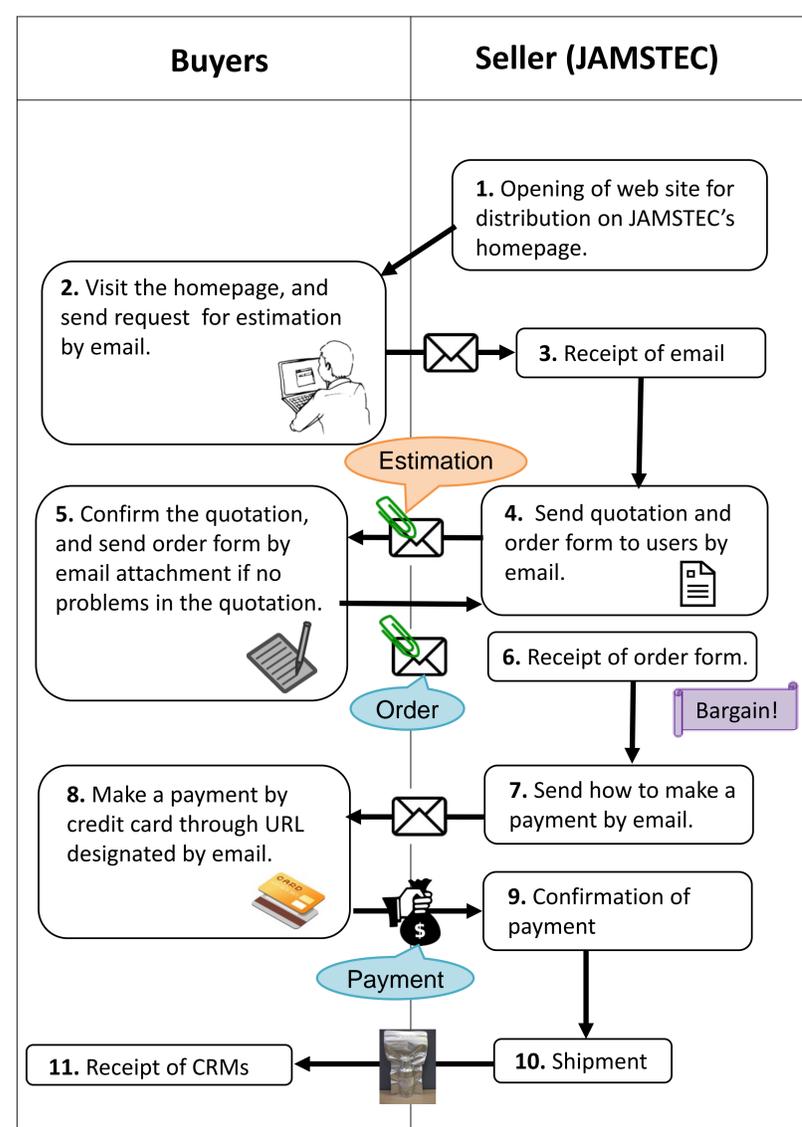


Photo 1. Atlantic surface seawater provided by NIOZ.



Photo 2. Newly-developed sterilization unit. It is still under development as of Sep. 2016.

Flow of fare-paid distribution of CRMs



SCOR-JAMSTEC CRM
CRM for nutrients in seawater provided by SCOR WG147

SCOR-JAMSTEC CRM

- Scientific background (cited from the SCOR WG#147 proposal)
- The SCOR WG#147
- IOCCP nutrients web page
- Previous inter-laboratory calibration exercises
- General Property
- Available Lots
- Price
- Order
- Storage/Handling
- Quality Control
- CRM production procedure
- References
- Chronological records
- Contact
- KANSO CRM
- NMIJ CRM

SCOR-JAMSTEC CRM

Japan Agency for Marine-Earth Science and Technology (JAMSTEC) is happy to start to provide Nutrient CRM's with the SCOR-JAMSTEC logo, with a new cost structure making them more accessible for the global science and research community collaborating with the SCOR WG#147 "Towards comparability of global oceanic nutrient data (COMPONUT)".

CRM for nutrients in seawater provided by SCOR WG147

This CRM is produced by KANSO on a commission basis and distributed by JAMSTEC based on a framework of SCOR WG147, COMPONUT. Business contact: crm_nutrients@jamstec.go.jp Scientific issues: Michio Aoyama, r706@ipc.fukushima-u.ac.jp and Malcolm Woodward, m.woodward@pml.ac.uk

Fig. 1 The website (top page) for distribution of CRM, opened on JAMSTEC's homepage (tentative).