



Experiment Report Form

The double page inside this form is to be filled in by all users or groups of users who have had access to beam time for measurements at the ESRF.

Once completed, the report should be submitted electronically to the User Office via the User Portal:
<https://www.esrf.fr/misapps/SMISWebClient/protected/welcome.do>

Deadlines for submission of Experimental Reports

Experimental reports must be submitted within the period of 3 months after the end of the experiment.

Experiment Report supporting a new proposal (“relevant report”)

If you are submitting a proposal for a new project, or to continue a project for which you have previously been allocated beam time, you must submit a report on each of your previous measurement(s):

- even on those carried out close to the proposal submission deadline (it can be a “*preliminary report*”),
- even for experiments whose scientific area is different from the scientific area of the new proposal,
- carried out on CRG beamlines.

You must then register the report(s) as “relevant report(s)” in the new application form for beam time.

Deadlines for submitting a report supporting a new proposal

- 1st March Proposal Round - **5th March**
- 10th September Proposal Round - **13th September**

The Review Committees reserve the right to reject new proposals from groups who have not reported on the use of beam time allocated previously.

Reports on experiments relating to long term projects

Proposers awarded beam time for a long term project are required to submit an interim report at the end of each year, irrespective of the number of shifts of beam time they have used.

Published papers

All users must give proper credit to ESRF staff members and proper mention to ESRF facilities which were essential for the results described in any ensuing publication. Further, they are obliged to send to the Joint ESRF/ ILL library the complete reference and the abstract of all papers appearing in print, and resulting from the use of the ESRF.

Should you wish to make more general comments on the experiment, please note them on the User Evaluation Form, and send both the Report and the Evaluation Form to the User Office.

Instructions for preparing your Report

- fill in a separate form for each project or series of measurements.
- type your report in English.
- include the experiment number to which the report refers.
- make sure that the text, tables and figures fit into the space available.
- if your work is published or is in press, you may prefer to paste in the abstract, and add full reference details. If the abstract is in a language other than English, please include an English translation.

**Experiment title:**

Toba super-eruption volcanogenic pollution impact on marine calcareous planktonic foraminifera

Experiment number:

LS-2498

Beamline:

ID21

Date of experiment:

from: 15 Apr 2016
to: 19 Apr 2016

Date of report:

24/2/21

Shifts:

12

Local contact(s):

Wout De nolf

Received at ESRF:

Names and affiliations of applicants (* indicates experimentalists):

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Report: This experimental work was published in

Lemelle, L., Bartolini, A., Simionovici, A. *et al.* Nanoscale trace metal imprinting of biocalcification of planktic foraminifers by Toba's super-eruption. *Sci Rep* **10**, 10974 (2020). <https://doi.org/10.1038/s41598-020-67481-w>

Nanoscale trace metal imprinting of biocalcification of planktic foraminifers by Toba's super-eruption

Bioactive metal releases in ocean surface water, such as those by ash falls during volcanic super-eruptions, might have a potentially toxic impact on biocalcifier planktic microorganisms. Nano-XRF imaging with the cutting-edge synchrotron hard X-ray nano-analysis ID16B beamline (ESRF) revealed for the first time a specific Zn- and Mn-rich banding pattern in the test walls of *Globorotalia menardii* planktic foraminifers extracted from the Young Toba Tuff layer, and thus contemporaneous with Toba's super-eruption, 74,000 years ago. The intra-test correlation of Zn and Mn patterns at the nanoscale with the layered calcareous microarchitecture, indicates that the incorporation of these metals is syngenetic to the wall growth. The preferential Mn and Zn sequestration within the incipient stages of chamber formation suggests a selective incorporation mechanism providing a resilience strategy to metal pollution in the test building of planktic foraminifers.

