

Southern African Data Centre
for Oceanography
P O Box 320, Stellenbosch 7599
South Africa

Manager: Marten Gründlingh

Email: mgrundli@csir.co.za

Website: <http://sadco.csir.co.za>

SADCO is sponsored by ...

- Department of Environmental Affairs
- SA Navy
- CSIR
- SAEON
- Namibian Ministry of Fisheries & Marine Resources



Last paper version of the Newsletter

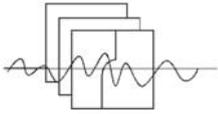
After about 20 years of paper-based newsletters, and following a global trend in newsletters and publications, SADCO will stop the **paper version** of the Newsletter after the present edition. From the next Newsletter (February), the web-based copy on <http://sadco.csir.co.za> will be the only version.

We would like to inform you when the Newsletters appear in future. For this, we will appreciate your e-mail address or anybody you would like to recommend. Please drop a line to mgrundli@csir.co.za and put **SADCO Newsletter** in the subject line.

SADCO submits regional hydrographic data to the World Data Centre

According to the United Nations Intergovernmental Panel on Climate Change's 4th Assessment Report the Earth's ocean is warming up due to anthropogenic induced global warming. To ensure that the best data is available for studies of climate and other impacts SADCO endeavours to make unflagged data available to the World Data Centre (WDC). In a recent transfer, data from 92 cruises was submitted to WDC. This data was collected by the National Marine Information and Research Centre (NATMIRC) of the Namibian Ministry for Fisheries and Marine Resources (NMFMR), who kindly released the data into the public domain. NMFMR has been a co-sponsor of SADCO for many years. **Chris Bartholomae** and

Anja van der Plas, oceanographers of NATMIRC, are thanked for their part in the data collection, processing and releasing process. It is believed that, through this initiative, NATMIRC and SADCO are making a valuable contribution to Global Climate Research. The WDC uses such data as part of its vast pool of hydrographic stations to generate global ocean climatologies, which, in turn, offer reference points or baselines against which environmental scientists can measure changes in ocean dynamics and chemistry. SADCO has a commitment to submit regional data to WDC as data becomes available.



The SADC0 extraction queuing system, in a nutshell

Every time a user submits a request for on-line extraction via the inventory,

- ▶ The extraction program adds the job to the end of a queue. The job could be the only one in the queue, in which case there is no 'waiting period'.
- ▶ When the job reaches the head of the queue, the extraction commences.
- ▶ When the extraction is completed the user is informed by e-mail that the extracted data is ready for download.
- ▶ The job is then deleted from the queue, and a summary of the extraction i.t.o. data type extracted, date/time and area ranges of the data, the duration of the waiting time in the queue, and the duration of the extraction is logged.

If for some reason, an error occurs with the extraction, causing the job to hang, a 'queue watcher' checks for jobs that have been busy extracting for longer than 10 minutes. Since all jobs should be completed within less than 3 minutes, the hanging job is then deleted from the queue, all other jobs moved up one place, and the user and SADC0 are informed by e-mail of this event. SADC0 will then follow up to see what went wrong, and liaise with the particular user to deal with the matter.

Our records show that, up to now, the only extractions that have been queued originated from the same user submitting a number of extractions in quick succession.

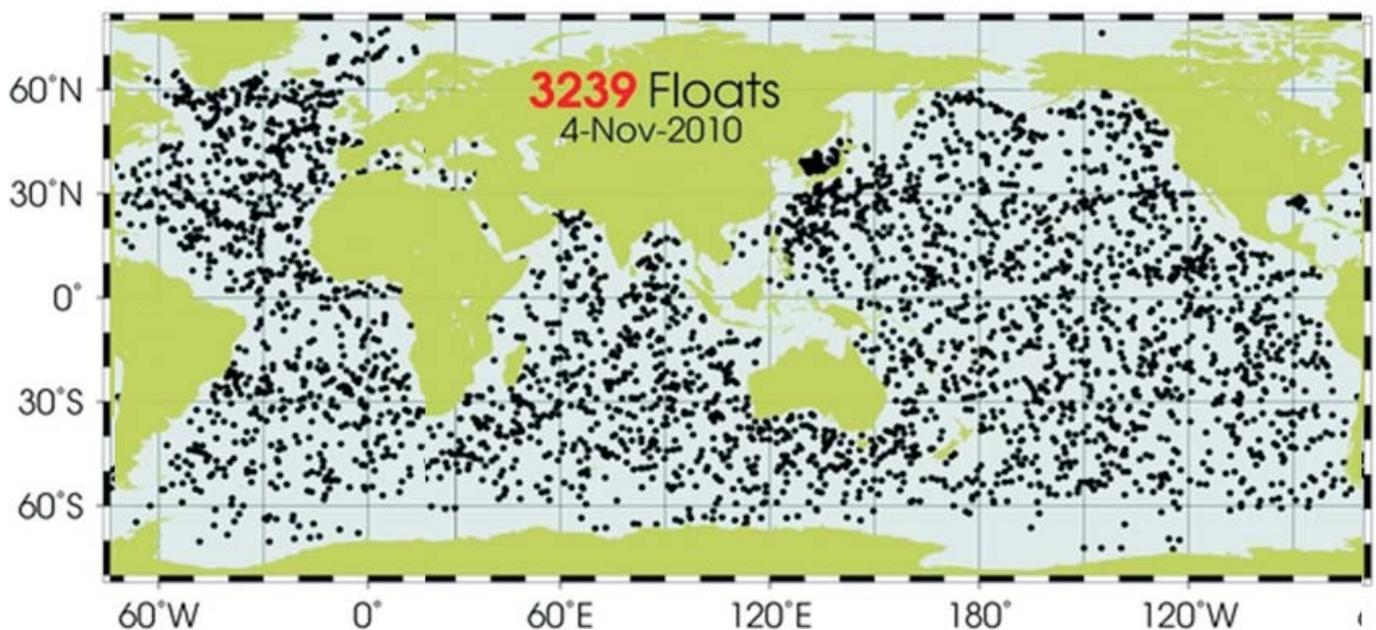
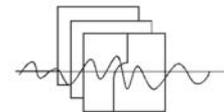


Figure 1. Illustration of the current global distribution of Argo floats (from: www.argo.ucsd.edu). At the time of writing 3239 Argo floats are active.



More Argo data loaded!

“Argo data is considered of pivotal importance for filling the data gaps existing in the under-sampled Southern Hemisphere oceans.”

Argo floats are autonomous profilers of the water column of the global ocean. They have been deployed all over the global ocean and drift along with the ocean's surface, intermediate, and deep currents. At the time of writing there are 3 239 floats in operation (Fig. 1).

A total of 726 Argo floats have recently passed through the SADC target area and reported their hydrographic data via satellite from 46 152 surface stations (Fig. 2). This (delayed mode) data has now been loaded and is available for extraction by SADC users, bringing the total number of Argo stations in our target area to 67 760. Argo floats were briefly discussed in SADC's Newsletter Volume 19 (2) of June 2008 (see www.sadco.csir.co.za/newsletter), here again these very innovative ocean observing devices are reviewed.

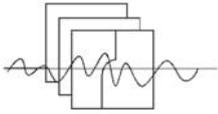
What is Argo?

A description of the operational cycle of ARGO floats can be found at www.argo.ucsd.edu.

Argo floats are programmed to have 10 day cycles. About 9 days are spent at a preset depth (say, 1 000m) during which time the float drifts with the current at that depth.

During its profiling stage, the float can be set to sink to 2 000m before rising continuously to the surface. During the ascent – which takes about 6 hours - continuous profiles of temperature and salinity are obtained of the different water masses it passes through. When the float finally reaches the surface of the ocean, its data is transferred to satellites that also fix the float's location. The float remains at the surface for a while before sinking to its preset depth and the cycle is repeated. Argo floats are designed to make about 150 such cycles during their planned life span of approximately four years.

The data is relayed to ground stations and quality controlled before being archived and made available to scientists in real-time or delayed-mode. A real time data system delivers 90% of profiles to users via global data centres within 24 hours of satellite transmission. A delayed mode quality control system has also been established and normally 60% of all eligible profiles are subjected to this. SADC downloads delayed mode data only.



What is Argo data used for?

The Argo programme is the initiative of CLIVAR (Climate Variability and Predictability Experiment) of the World Climate Research Programme. The programme began in 2000 and by November 2007 the target array of about 3000 floats was achieved. The programme plans to continue and maintain the +3000 fleet of Argo floats into the future. This support is mainly due to the important contribution Argo is making to Global Climate Change Research. Scientists now acknowledge that the planet's ocean is warming up due to man-made global impacts, the consequence of uncontrolled emissions of fossil fuel pollutants into Earth's atmosphere (Levitus *et al.*, 2005). The ocean covers about 70% of the Earth's surface and is the main regulator of global climate as it absorbs almost half of all greenhouse gasses produced by humans. The draw-down of anthropogenic induced CO₂ and excess heat is causing the ocean to rapidly depart from its climatological mean state. An upward trend in ocean heat and dissolved CO₂ content is causing the ocean to change its present-day circulation and water chemistry. This change is known as accelerated Global Oceanic Climate Change. The Argo programme is directed and geared

towards monitoring this oceanic change in the upper 2km of the global ocean. And it is foreseen that in the near future more hi-tech Argo floats will be deployed that will measure the global CO₂ system of the ocean.

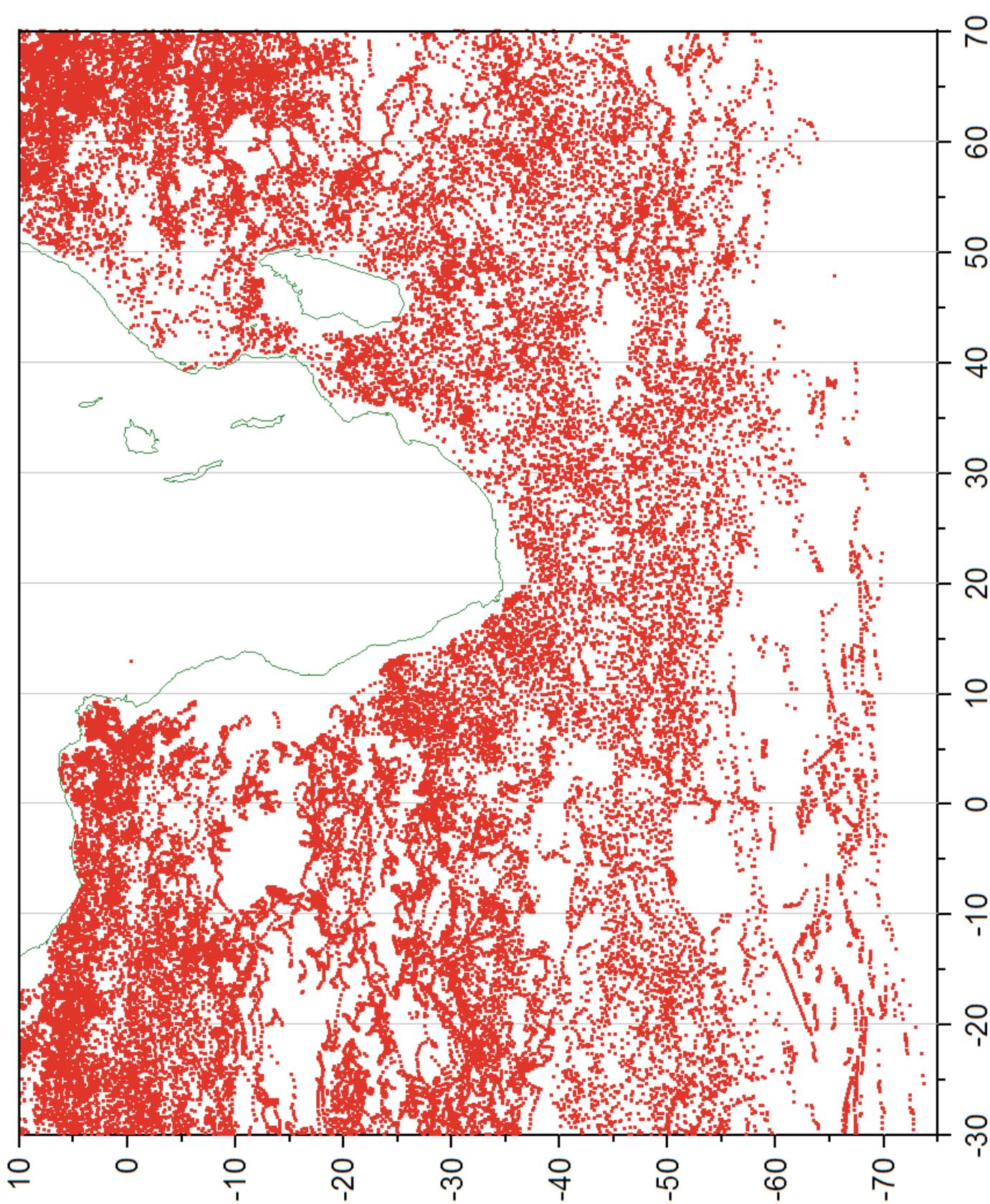
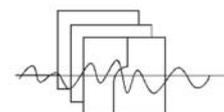
Argo floats are of pivotal importance since the region around Southern Africa and the Southern Ocean is under-sampled in terms of real-time data. A shortage of oceanic data here may impact on our ability to understand and predict oceanic climate change, and Argo data is helping to fill these historical data gaps.

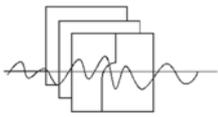
The data can be extracted from SADC0 using on-line and off-line access. SADC0 plans to update its Argo inventory on an annual basis, which will give regional users and climate scientists improved data coverage for the region surrounding Southern Africa.

Reference:

Levitus, S., Antonov, J., and T. Boyer (2005) Warming of the world ocean, 1955-2003. *Geophysical Research Letters*, Vol 32, L0260. 1-4.

Figure 2. Geographical distribution of Argo surface stations around Southern Africa recently loaded in SADC0. Each dot represents a surfacing station where a float reported to a satellite/..... (next page)





THE CLOSING CONFERENCE OF THE CENSUS OF MARINE LIFE

Introduction

The 10-year Census of Marine Life (CoML) was completed in October 2010, and the closing conference took the form of a review and celebration of the CoML's overall achievements. An estimated 150 – 200 people attended the scientific sessions that were held in the Royal Institute and the Royal Society in London. The aim of the Census was to *"assess and explain the diversity, distribution and abundance of marine life in the world's oceans - past, present and future"*.

News Conference

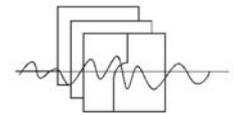
The symposium started with a news conference at the Royal Institute, during which the media were provided with insight into the main findings, but also with the opinions of the **impact** of the Census on the social and legislative environment. The Census had managed to obtain funding of about US\$670m, with 2 000 scientists from 80 countries all over the world participating. About 2 700 articles had already appeared on the Census results (<http://www.oceanleadership.org/programs-and-partnerships/the-census-of-marine-life/>), and there will probably be many more to follow.

The outcome of news conference became evident only a few days later when it was reported that in the 48 hours after the news conference there had been about 700 newspaper reports and 20 TV programmes on the Census, in more than 26 languages in virtually all countries of the world.



Figure 3. Some attendants of the Census of Marine Life Conference outside the Royal Society, London

The Census had managed to obtain funding of about US\$670m, with 2 000 scientists participating from 80 countries all over the world. About 2 700 articles have already appeared on the Census results



Venue

The Royal Society (Fig. 3) is a very prestigious institute, with a history going back to the 1600's. Some of the activities outside the marine biogeographic domain, and related to the many discoveries associated with the Society, are on display (see photographs, including the one of Newton's 1685 manuscript on gravitation) (Figs. 4 and 5).

Main sessions

The presentations during the symposium were awesome in content and impact. Many speakers mentioned the number of new species that had been discovered (some are still awaiting write-up). However, it was also indicated that, because the Census was not a snapshot of the marine population (unlike demographic censuses) but contains data stretching over decades/centuries, some of the species may already be lost. In fact, it was reported that the planet had already lost about 90% of the large marine mammal species. The main threats to biodiversity in the sea are overfishing, pollution and habitat loss.

Of specific interest was the report on OBIS (Ocean Biogeographic Information System). OBIS had managed to collate almost 30 million records of marine species observations. Of these, AfrOBIS had contributed 3.4 million records of about 15 000 species. Regions with the most species are in the vicinity of Australia, Japan and China.

The Indian presentation indicated that considerable data had been collected off northern Madagascar. This is an area where AfrOBIS has also scouted for data, but opportunity to transfer and load the data had not presented itself. AfrOBIS plans is to revisit that region.

The Census also provided opportunity to refresh the network and acquaintances that had been established during the ten years. Many speakers referred to the capacity and teamwork that had been generated during the Census, and expressed the hope that this "team" would continue cooperating in future.

Impression on next censuses

Just as all terrestrial demographic censuses are repeated at regular intervals to delineate changes in the overall number of people, their diversity and migrations, the Census of Marine Life is going to have to be repeated.

Future censuses should focus on data collected in a much shorter (10 year?) time window than the first one. However, our ability and methodology to collect the required data within such a short period will need to be geared up considerably in terms of **hardware** and **automation**.

There is talk of fish fitted with cards (not just tags) that communicate data about the environment to underwater sensors, bar-coding devices, autonomous underwater vehicles, remote operated vehicles, and newer models and analyses.

AfrOBIS was successful above all expectations, due to the willingness of marine biologists to share valuable data sets that had been built up over many decades. Many data sets are still "out there"

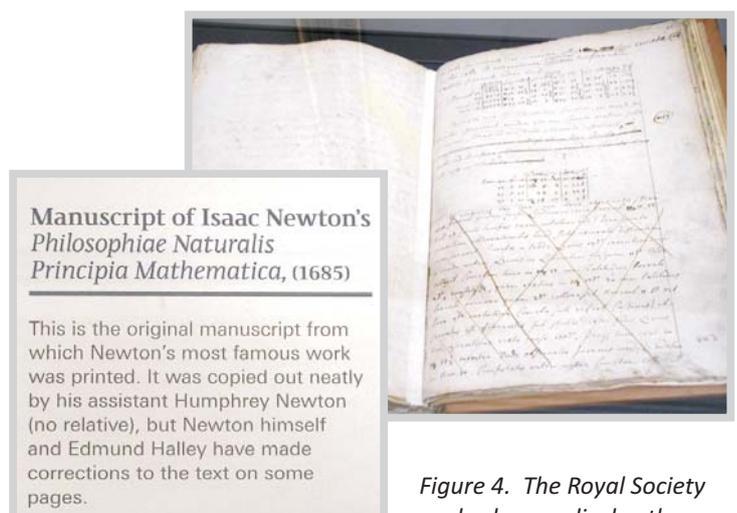
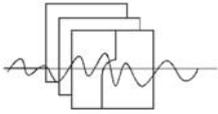


Figure 4. The Royal Society also has on display the original text of Newton's *Principia* of 1685.



Future of AfrOBIS

AfrOBIS was successful above all expectations. This was in no small way due to the willingness of marine biologists to share data that had been built up over many decades. AfrOBIS is aware of many data sets still "out there" that can be made available to augment the information presently in OBIS and plans to revisit such organisations in the whole of Africa. AfrOBIS is grateful for the funding initially provided by the SLOANE Foundation, and the funding since then received from SAEON.

With OBIS having moved into the Intergovernmental Oceanographic Commission earlier in 2010, the organisation and framework of AfrOBIS will now resemble more and more the framework of SADCO (also

residing under IOC and IODE). It is believed that AfrOBIS still has a significant contribution to make in terms of providing data from the South African and African domain.

Conclusion

The Census was a remarkable programme in all aspects (science, size, outreach, technology development, etc) and many further aspects (legislation, social impacts) will now need to be tackled to ensure that the benefits of the Census are exploited in the widest possible sense. Future censuses are already being called for. The scientists from Africa that contributed data can be justifiably proud of the role they played - and hopefully will continue to play - in the ultimate protection of marine biodiversity around our continent and in the world.

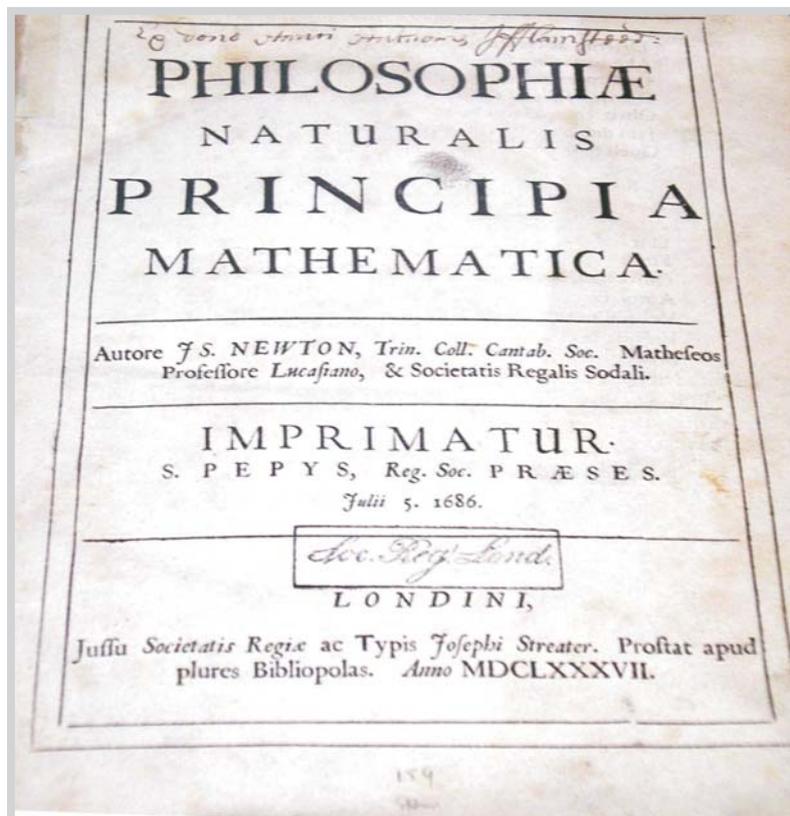


Figure 5. The first published edition of Newton's *Principia*.