16. Scientific production in the space sector

Scientific papers on satellite technologies have been published in specialised journals since the late 1950s, but they remained the remit of just a few experts for almost 30 years. After a first rise in the number of publications in the early 1980s, production stagnated until the end of the cold war. Since 1991, the multiplication of specialised journals and international conferences has strongly impacted the diffusion of publications on satellite technologies, growing from 2 000 to more than 6 000 in 2003, and reaching almost 16 000 papers in 2013 alone. This trend parallels the growing number of countries involved in space programmes, especially from the BRIICS.

In terms of subject areas, not surprisingly earth and planetary sciences, engineering, computer sciences, physics and astronomy are the leading topics. The growing role of satellite observations in natural resources management and climate monitoring are key drivers for some of the recent papers using satellite data. In 2013, 73.5% of the considered publications are articles in scientific journals and 26.5% are conference papers. When looking at the scientific production in satellite technologies' papers in 2003 and 2013, the United States leads with 28.2% of the total production of scientific articles in 2013. However a number of countries have seen their respective shares grow over the ten-year period, particularly Brazil, China, and India.

Authors from the top 40 institutions which published the most papers in scientific journals or conference proceedings on satellite technologies in 2008-13 are located in the United States, China, and Europe. Out of the original 160 major institutions selected (universities, research laboratories…), the NASA Goddard Centre leads the number of publications, followed by the Joint Propulsion Laboratory (JPL)/California Institute of Technology. The Chinese Academy of Sciences has leaped into the top three institutions over the period. Several Chinese universities that were not included in the top 160 institutions in 1999 have now entered the top 15 (e.g. Graduate University of the Academy of Sciences, the Wuhan and Beihang Universities), replacing other institutions from North America, Europe and the Russian Federation.

Methodological notes

Indicators based on bibliometrics (i.e. scientific publications) provide valuable information on knowledge production and diffusion in specific fields, including space technologies. Estimates of scientific production are based on whole counts of documents (papers in scientific journals and conference papers) by authors affiliated to institutions. Although some elements of space technologies and their applications still remain confidential (especially in the case of defence programmes), peer-reviewed scientific publications convey the research findings of scientists worldwide and give a good indication of the knowledge production in the field and its growing internationalisation. The data include scientific publications in English (the majority) as well as other languages. A slight decrease in the total of publications reported in 2013 may be caused by technical delays in refreshing databases.

Sources

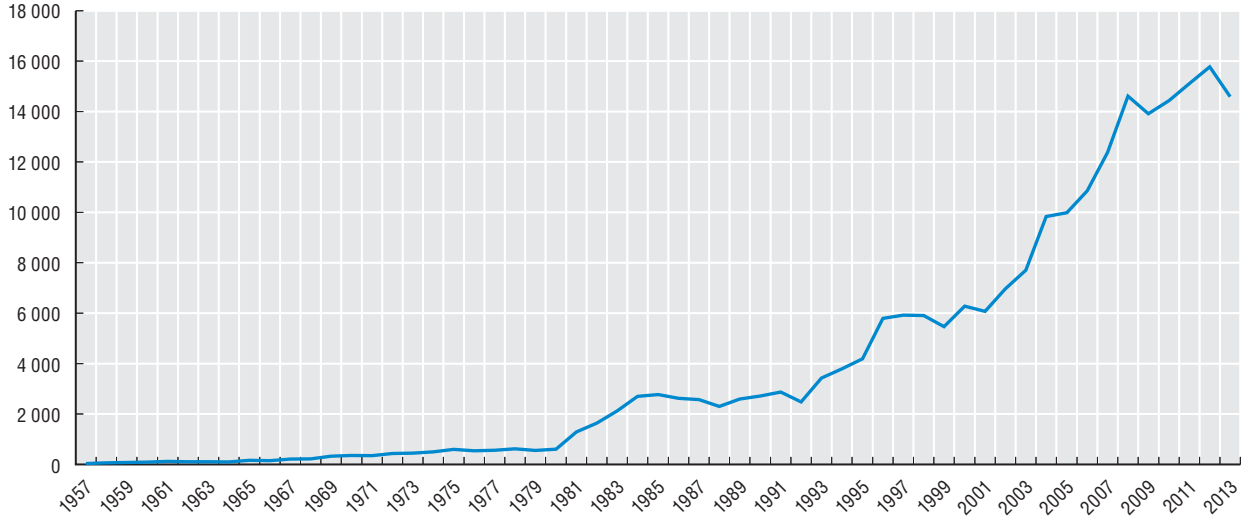
OECD calculations based on SciVerse® Scopus®, Elsevier B.V., accessed April 2014.

Note

Information on data for Israel: *http://dx.doi.org/10.1787/888932315602*.

16.1. Scientific production in satellite technologies since 1957

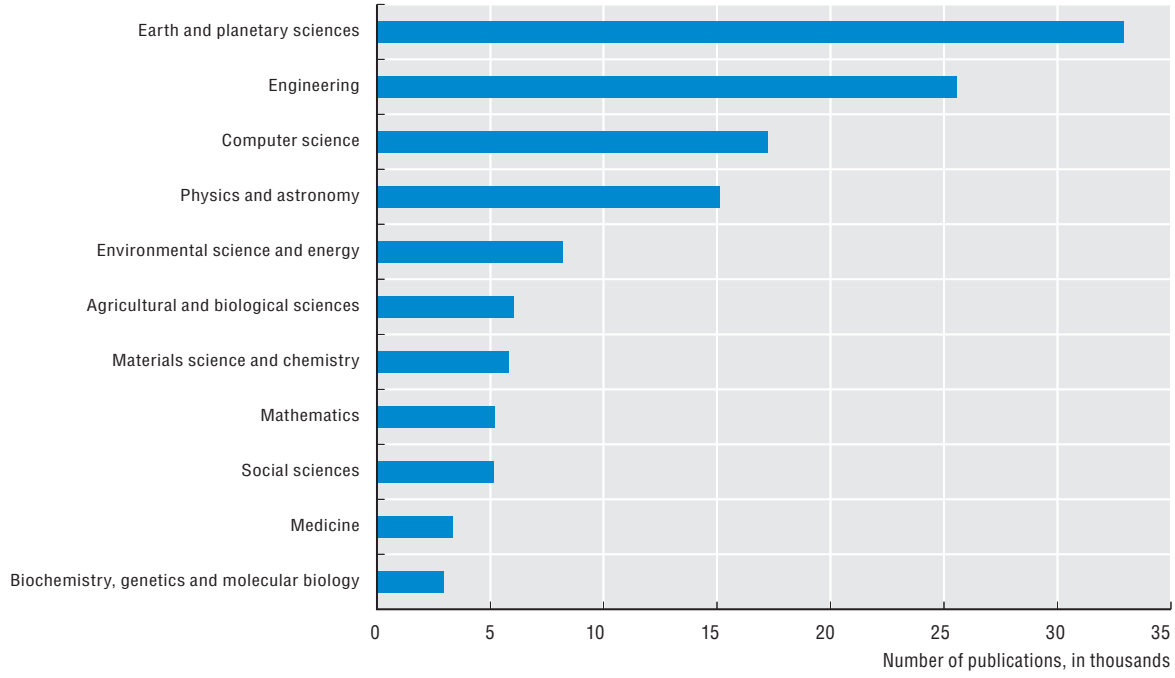
Number of publications



Source: OECD calculations based on SciVerse® Scopus®, Elsevier B.V., accessed April 2014.

16.2. Scientific production in satellite technologies by subject area

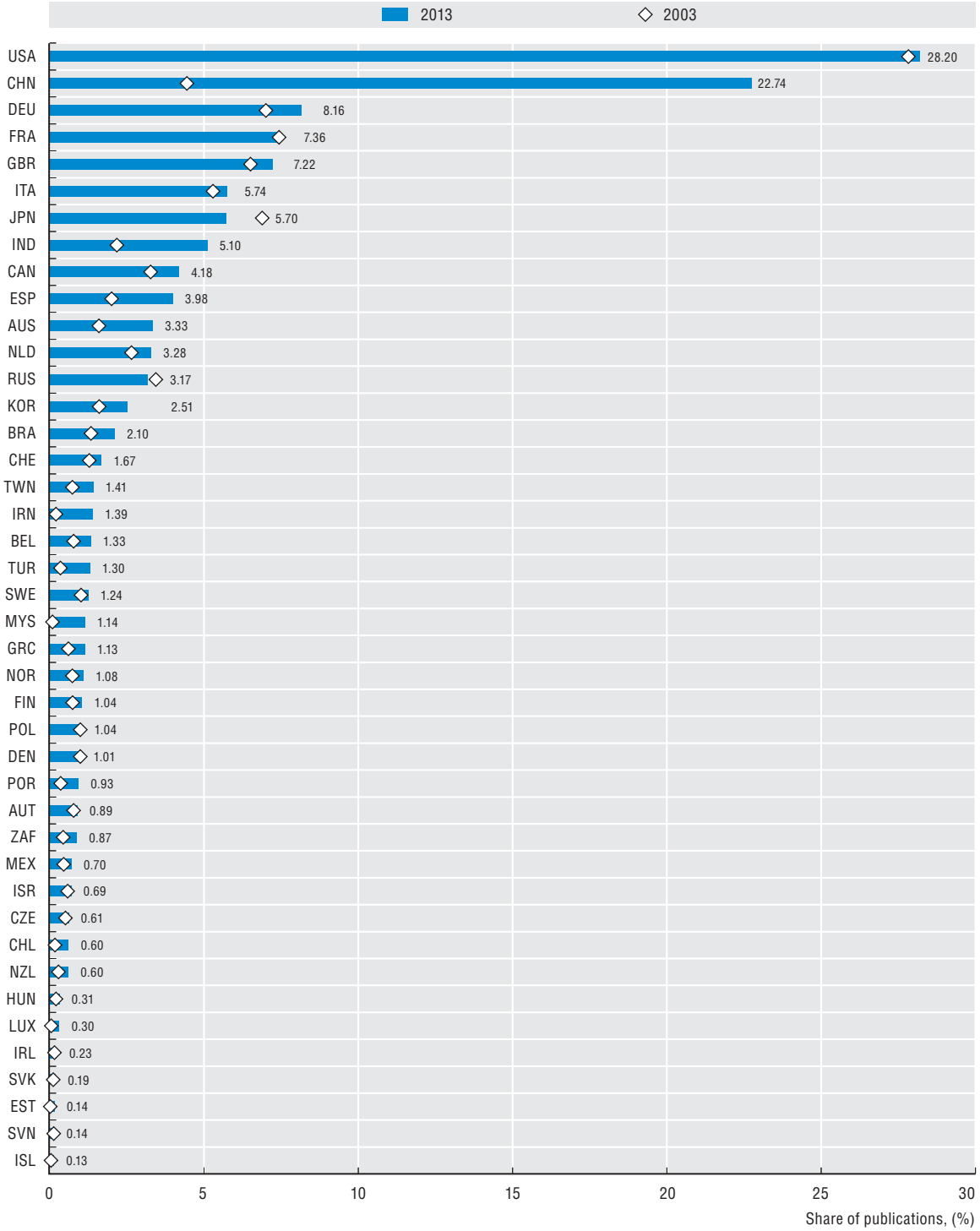
Number of publications, 2008-13



Source: OECD calculations based on SciVerse® Scopus®, Elsevier B.V., accessed April 2014.

16.3. Scientific production in satellite technologies per country

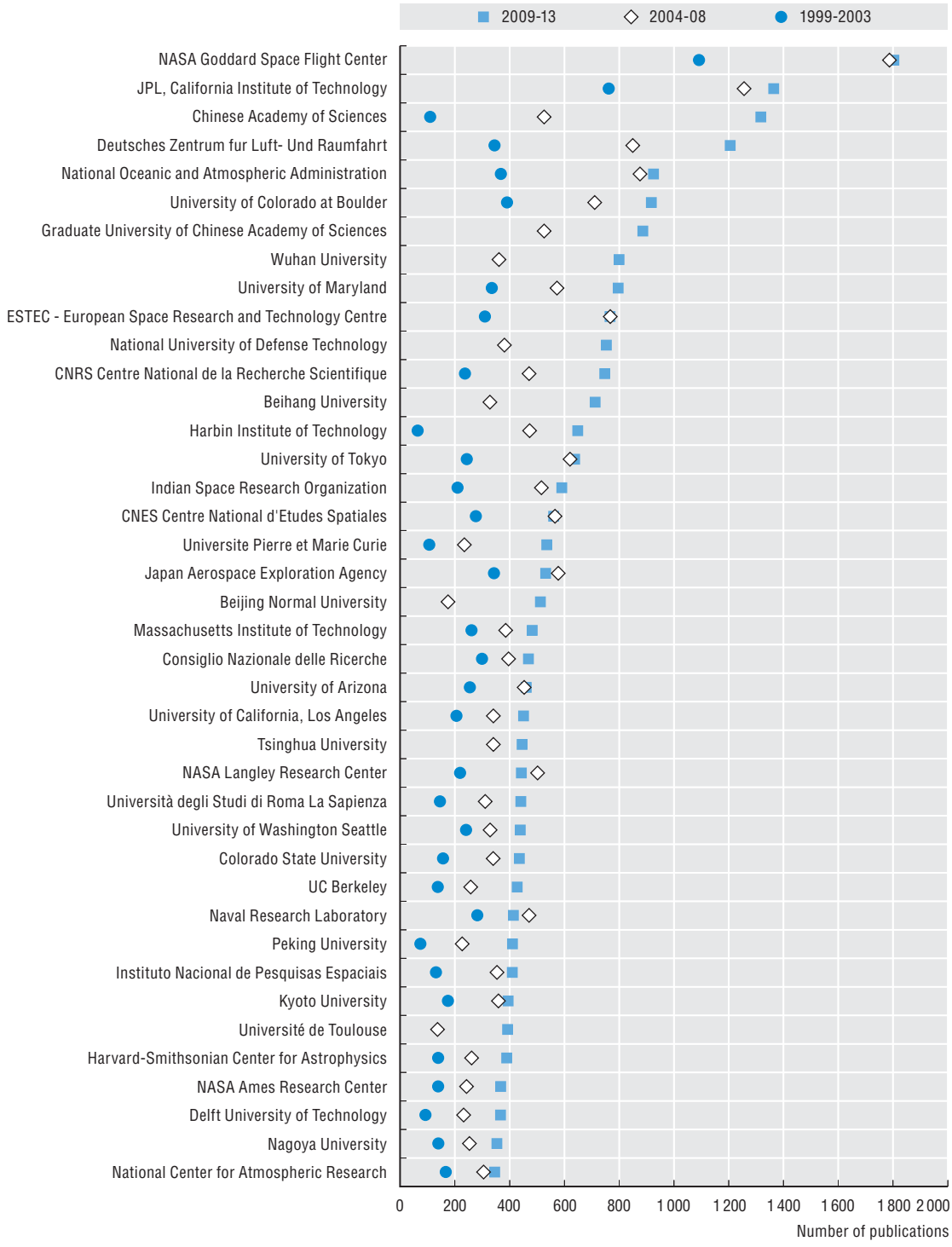
Share of publications per country, 2003 and 2013



Source: OECD calculations based on SciVerse® Scopus®, Elsevier B.V., accessed April 2014.

16.4. Scientific production in satellite technologies by top forty institutions

Peer-reviewed scientific publications over three five-year period, 1999-2002, 2003-08 and 2009-13



Source: OECD calculations based on SciVerse® Scopus®, Elsevier B.V., accessed April 2014.