

Bibliometric Investigations at the Special Astrophysical Observatory RAS

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Abstract. Bibliometric data for the Special Astrophysical Observatory are presented. Statistics and analysis of issues being brought out at SAO are given. Statistical data on publication of SAO research papers from the day of foundation of the observatory through 2000 are presented. The numbers of papers that appeared in domestic and foreign scientific issues are compared. An attempt is made to analyze the correlation of the number of scientific papers with the research of the observatory and also with the economical situation in Russia. It can be seen that the steady rise in publications observed from 1968 to 1991 gave way to an abrupt fall during the first (1991–1995) and second (1998) crises in our country.

1. Introduction

The Special Astrophysical Observatory of the Russian Academy of Sciences was founded by a decree of the Council of Ministers in 1966. The observatory was established to construct the two largest, at that time, astronomical telescopes and to organize observing with them. The telescopes were a big optical telescope on an alt-azimuth mounting (BTA) with a main mirror diameter of 6 m and a radio telescope RATAN-600 having a circular antenna 600 m in diameter.

The observatory staff numbered a few people at that time: the director, the assistant director, the chief book-keeper and two research workers. By 2000 the staff consisted of 480 employees including 110 research workers.

2. Publications of the observatory

The first publication of the observatory was *Soobshcheniya SAO (SAO Communications)*. Publication started in 1969 and terminated in 1993. In 1970 the first volume of *Izvestiya* of SAO was issued, which was given a new name, *Bulletin of SAO*, in 1993. Since that time it has been available in English. This is the main publication of our observatory. Since 1989 Preprints of SAO and the St. Petersburg Branch of SAO have been published. In 1995 the *Annual Reports* of SAO began to be printed in two languages (English and Russian). The observatory has issued 5 books: these are proceedings of the conferences held at SAO, and also a series of lectures for students.

For the quantitative analysis of the publications the number of pages in each of the papers was counted. However, in order to compare different issues

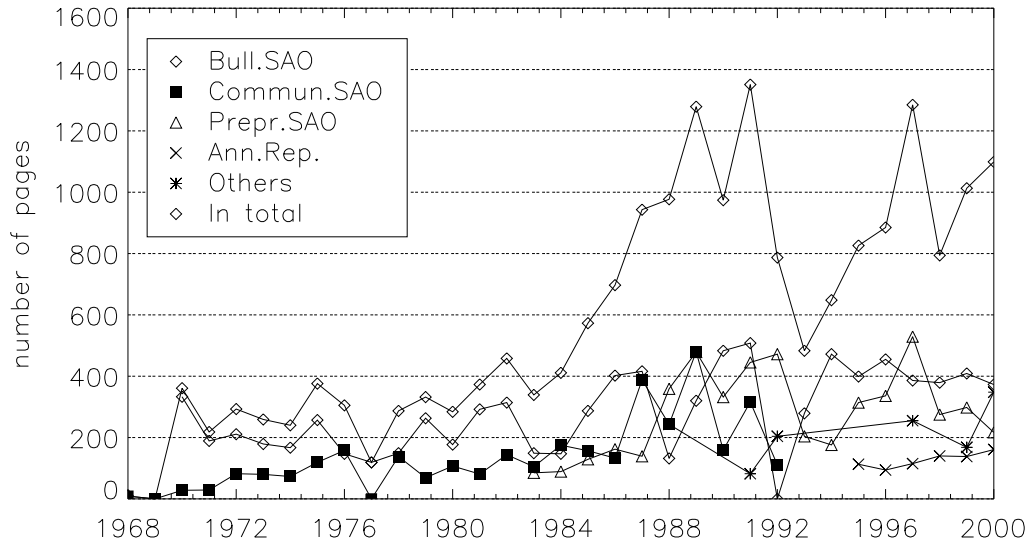


Figure 1. SAO Editions in 1968-2000.

with one another, a concept of “average page” was introduced. A page of the *Bulletin of SAO* published from 1970 to 1990 was adopted as a unit. For the rest of the publications, including the *Bulletin of SAO*, which changed the format, a transition coefficient was calculated in the following manner: the average number of characters in a line of a page filled with text was calculated and multiplied by the number of lines. This quantity was then divided by the number of characters contained on the average page of the standard volume of the *Bulletin of SAO*. The number of pages of an issue multiplied by this coefficient will yield the number of average pages of the article examined.

One can see from Fig. 1 that the number of printed pages rose smoothly enough until 1989, which was followed by a fall in 1990, a rise to a maximum in 1991 and then a sharp drop in 1992-1993. The 1992 volume of the *Bulletin of SAO* did not appear at all. The number of Preprints and Communications of SAO decreased.

This short account is not concerned with offering an explanation of all those things, but it will be recalled that in 1991 our country suffered an economic slump, rouble devaluation, and hyperinflation. It should to be noted that the investigations presented cannot serve as an indicator of the rise and fall in the economic situation because the printed production, as well as any other output, is somewhat sluggish. Thus, it turned out that the most unfavourable year was not 1991 (the year of the crisis), but 1992-1993 when the economic situation improved a little. The next crisis in the country was in 1997, although the diagram shows that for publications it was 1998 which was not at all favourable.

A rise in publications was observed in 1999-2000. This was mainly due to the appearance of the proceedings of a conference on magnetic fields of chemically peculiar stars held at SAO in 1999 and the lectures for high-school students who did their practical work at the observatory.

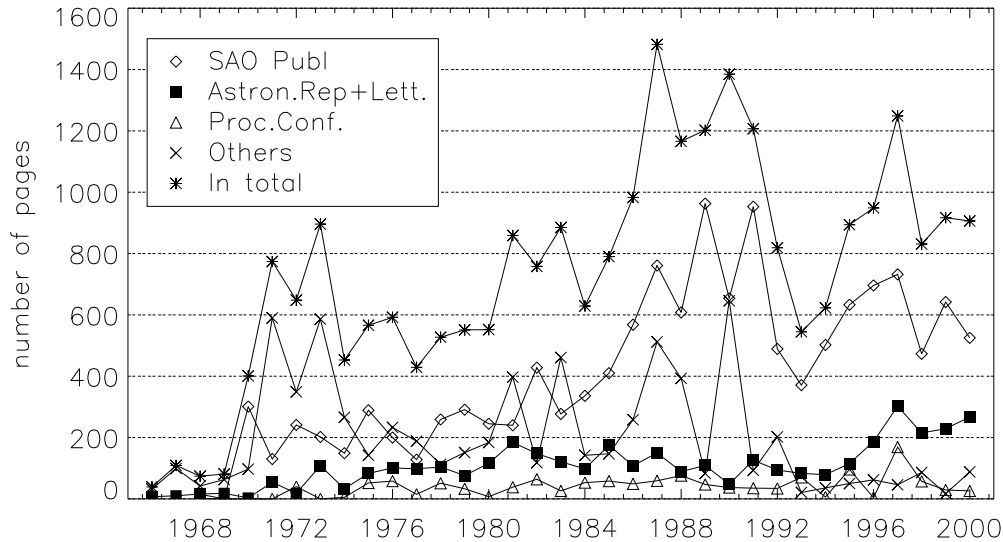


Figure 2. Publications of SAO Staff Members in Domestic Editions.

3. Publications of SAO research workers in home editions

To have a better knowledge on the nature of variations in the number of publications of our observatory, it was decided to make a quantitative analysis of the publications of our staff in domestic and foreign editions. It would be interesting to know whether the number of published papers depends only on the number of researchers of the observatory, or if there are other factors that affect this index.

Data for the analysis of SAO publications in domestic and foreign editions were selected as follows: from the card index of papers of scientists, which has been kept in our library since the first days of SAO, the number of pages in each article was computed, which can be easily done from the bibliographic description of the paper, and recalculated to average pages. This number was entered into a table, in a cell referring to the authors name, the given edition, and the given year. In order that the papers written by a team of authors should not be included in the table several times, only the first author was taken (the staff member of SAO and only during the period of working at SAO). Then, having added together all the data for the different authors, we obtained the data for the given journal and the year. We took into account the following journals: *Astronomical Report*, *Astronomical Letters*, *Solar Data*, *Izvestiya of Crimean Astronomical Observatory*, *Izvestiya of Odessa University*, the journal *Astrofizika (Astrophysics)* (the edition of Byurakan Observatory), SAO editions (*Bulletin*, *Communications* and *Preprints*), proceedings of conferences, popular-scientific editions and other domestic publications. The average page was derived for all these issues, but for the last three: proceedings of conferences, popular-scientific editions and other domestic editions containing papers that had appeared in a variety of books and journals. For these, we adopted an index equal to 1.

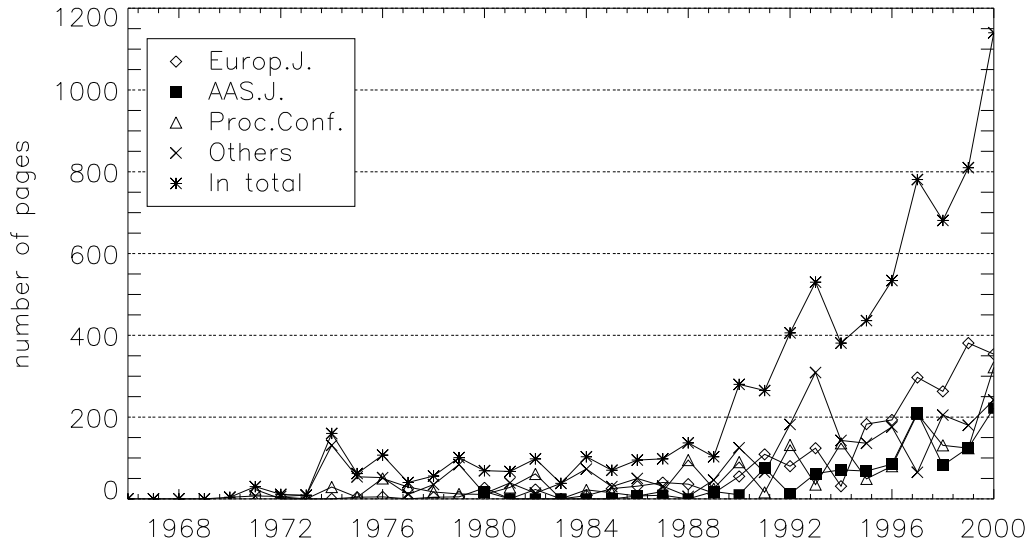


Figure 3. Publications of SAO Staff Members in Foreign Editions.

For illustration, in order not to overburden the diagram with data, *Izvestiya of CrAO*, *Izvestiya of Odessa University*, *Astrofizika* and *Solar Data* fell within a category “Other domestic publications” but with pages recalculated to the average page. Preprints, which are but the precursors of the papers expected to appear in scientific journals, are treated as independent issues, which often do not appear anywhere or are published largely revised.

A curve characterizing the number of publications of the SAO staff members, which are available in domestic editions, is displayed in Fig. 2. It should be noted that the sharp drop in the number of publications in the years 1991–1993 can also be observed here. It can be seen that since 1998, the number of publications has exhibited a tendency to decrease.

4. Publications of SAO staff members in foreign editions

As in the foregoing section, we counted here the number of pages in each edition for the first author (SAO researcher) each year. Then the data were recalculated with the application of the coefficient for each edition. As previously, the primary standard was the volume of the *Bulletin of SAO*. The following editions were examined: *Astronomische Nachrichten*, *Astronomy & Astrophysics*, *Astrophysics and Space Sciences*, *Monthly Notices of the RAS*, *Astronomical and Astrophysical Transactions*, *Solar Physics* (European journals), *Astronomical Journal*, *Astrophysical Journal*, *Astrophysical Journal Supplement Series*, *Publications of the Astronomical Society of Pacific* (journals of the American Astronomical Society) and also proceedings of conferences and other publications. The preprints of foreign observatories and institutes, in which our staff members happened to be co-authors, were not taken into account in the given paper, because these papers were published in journals later.

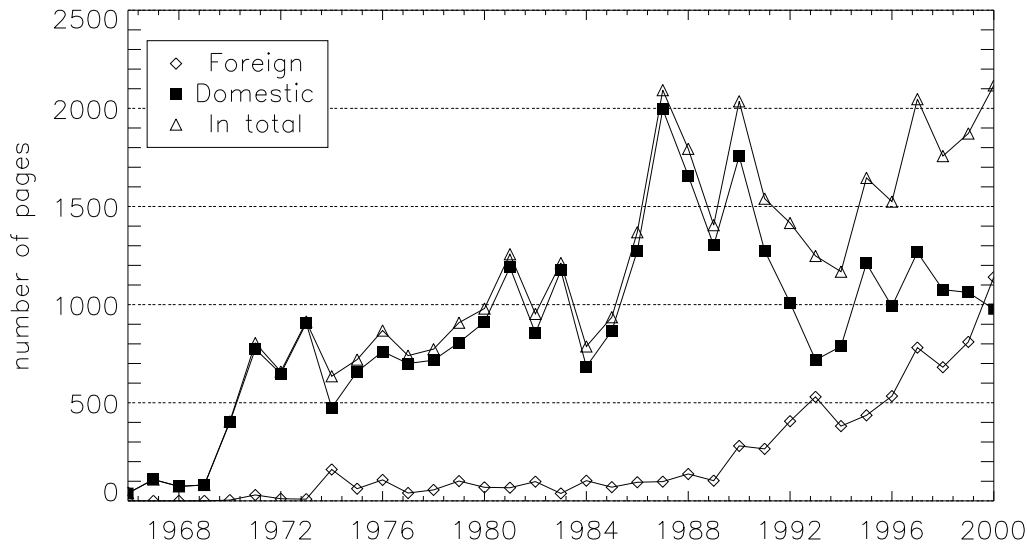


Figure 4. A Total Number of Publications of SAO Staff Members in Domestic and Foreign Editions.

For the first time a paper of SAO staff workers appeared in the book *The Structure of our Galaxy*. This was the proceedings of the IAU Symposium No. 38 held in Basel, Switzerland. At that time it was difficult to participate in a conference abroad or to publish a paper in a foreign journal, for we lived behind the “iron curtain”. Nevertheless, since 1972 (Fig. 3) the papers of our authors have begun to appear in foreign editions, and since 1990 a steady rise in these publications has been noted. During the years 1999–2000 the number of publications of our collaborators in foreign editions exceeded domestic publications (Fig. 4).

5. Mean number of publications

Fig. 5 illustrates the quantitative variations of the scientific staff of SAO from 1966 to 2000. By 1992 the number of researchers increased, reaching a maximum of 192. After that the staff was cut down several times, however, for the last four years the number of researchers in our observatory has undergone minor changes.

In order to see whether there exists a relationship between the number of publications and the number of researchers, the average number of pages per capita was calculated. It was calculated in the following way: the number of pages of publication during a year was divided by the number of SAO researchers in this year. Such data were derived for the publications in domestic editions, for foreign ones and for both taken together for the year.

Fig. 6 exhibits a strong increase in the average number of publications in 1970–1971, up to 31.15 pages per capita and then this index fell to an average

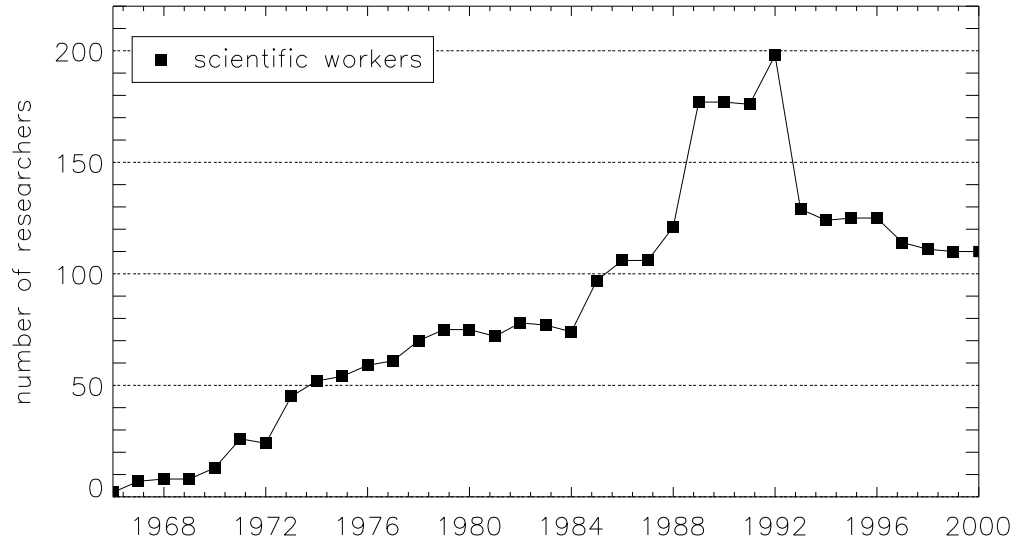


Figure 5. Number of SAO Scientific Workers.

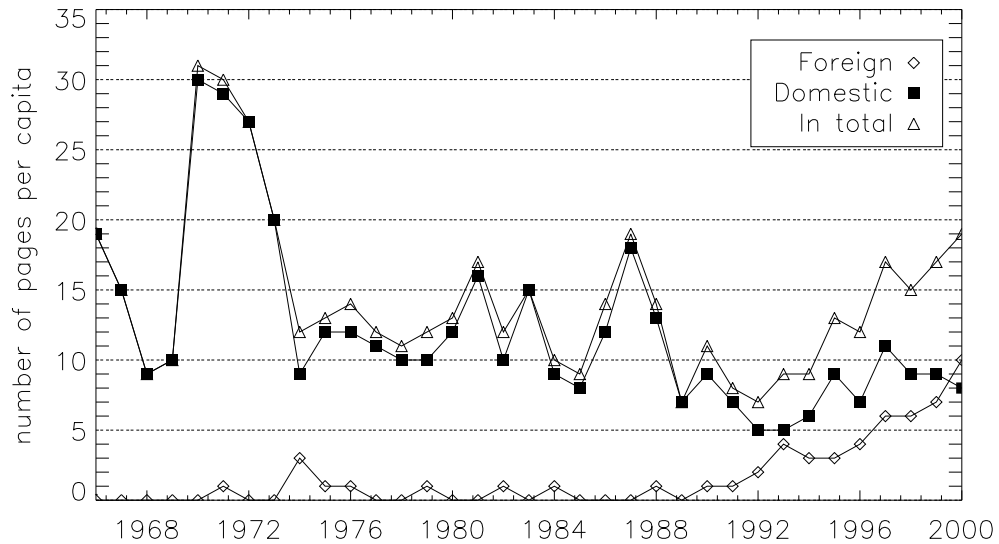


Figure 6. Mean Number of Publications of SAO Researches.

level of 10-15 pages per capita. This means that there is no direct relationship between the number of publications and the number of research workers of SAO.

6. Conclusion

The results of this work show that the total number of publications of the staff of our observatory tends to grow, the number of publications in foreign editions is increasing. The index of the average number of publications is also growing, which suggests that the article output of every researcher has increased.

Acknowledgments. I wish to express my thanks to S.N. Fabrika, who took the lead and inspired the work, to G.S. Shvedova for her valuable advice, N.F. Vojkhanskaya for editing and discussing the paper, and to V.M. Shapoval for the translation.

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