

## **STAFF LIST FOR 2005**

Mr. Avi Shapira (Ph.D.) – Director

Mrs. Maureen Aspinwall – Administration and Finance Officer

Ms. Maiclaire Bolton (M.Sc.) – Seismologist

Mr. Peter Dawson (Ph.D.) –Data Collection Manager and Applications Developer

Mr. Mathew Evans (M.Sc.) – Ph.D. student (Leeds University associate)

Mr. James Harris (B.Sc.) – System and Data Base Administrator

Mr. Dmitry Storchak (Ph.D.) – Chief Seismologist

Mr. Robin Adams (Ph.D.) – Honorary seismologist

## **VISITORS TO THE ISC IN 2005**

Dr. P. Firbas and Dr. B. Schurr, International Data Centre, CTBTO, Vienna, Austria.

Ms. R. Cooper, The Royal Society of London, UK.

Prof. S. Mertikas, Technical University of Crete, Greece.

A delegation of the China Earthquake Administration, Beijing, China, Headed by the Deputy Director General of China Earthquake Administration Prof. Yue Mingsheng.

Dr. K. Mayeda, Lawrence-Livermore National Laboratory, Livermore, USA.

Dr. J. Adams, Geological Survey of Canada, Ottawa, Canada.

Prof. J. Woodhouse, Oxford University, UK.

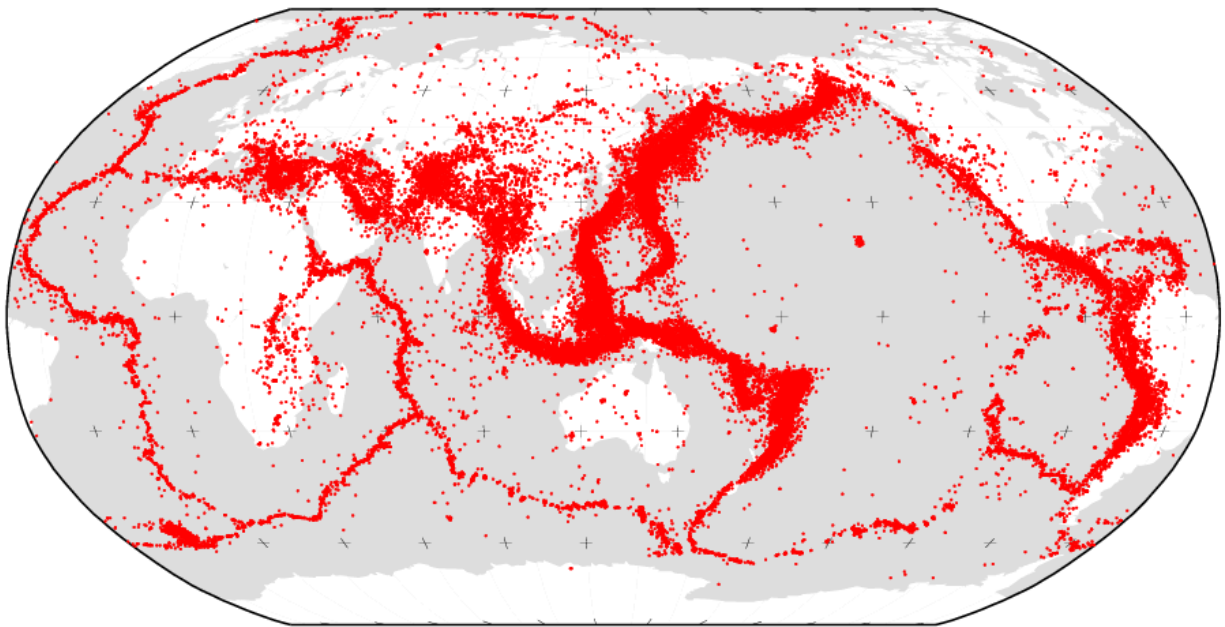
Students from Imperial College, London. UK

## **DIRECTOR'S REPORT 2005**

### **Introduction**

The year 2005 was characterized by the final debugging and assimilation of the ISCloc system into the routine operations of the ISC consisting of seismological data collection, analysis and editing, data archiving and publication of the ISC *Bulletin* and *Catalogue*. The latest development of that system involved the preparation of the PDF files directly from the database.

During 2005 the ISC published 3 printed issues of the 4-monthly *Bulletins*, an annual *Bulletin* for 2002 on CD and an updated earthquake catalogue for 1904-2002 (see seismicity map in Fig. 1). The financial audited report for 2005 is attached as a complementary document.



*Fig. 1* : World Seismicity 1904-2003 ( $M > 5$ ).

## Data Collection

During 2005, normal operational aspects were carried out i.e., inspecting the automated e-mail data acquisition through the Internet and dealing with unknown stations, data entry mistakes, changing of e-mail formats etc. In 2005 the ISC received 8621 data files from 117 agencies (see map in Fig. 2), reporting readings from 3917 seismic stations (see map in Fig. 3). These have been associated with correcting and writing parsers and with extensive correspondence with station operators and data providers. During the reporting period, 8 new parsers were written and 31 were modified. In all, there were about 120 instances when parsers and other data collection software routine have been changed.

334 new seismic stations contributed to the data year 2003 (about equal to the number of new stations contributing data during 2005) and there was a 6% increase in total contributing stations over the previous year. 8 new agencies also began contributing 2003 data and PLV resumed its data contributions.

CRAAG - Centre de Recherche en Astronomie, Astrophysique et Geophysique Craag, Algeria

GBZT - TUBITAK, Marmara Research Center, Gebze, Turkey .

GRAL - National Centre for Geophysical Research, Beirut, Lebanon.

HLW - National Research Institute of Astronomy and Geophysics, Helwan, Cairo, Egypt.

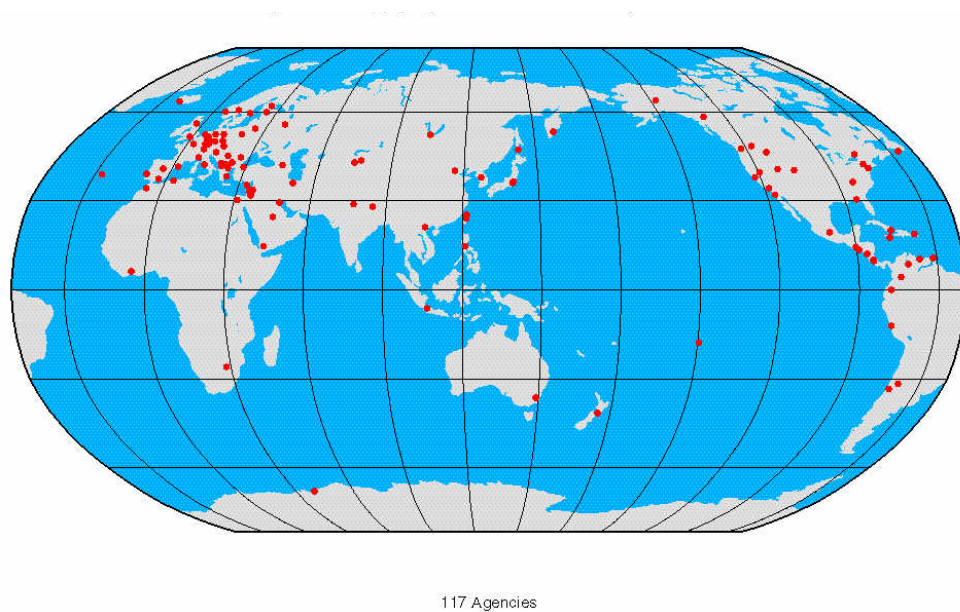
ISN - Iraqi Meteorological and Seismology Organisation, Baghdad, Iraq.

OMAN - Sultan Qaboos University, College of Science, Sultanate of Oman.

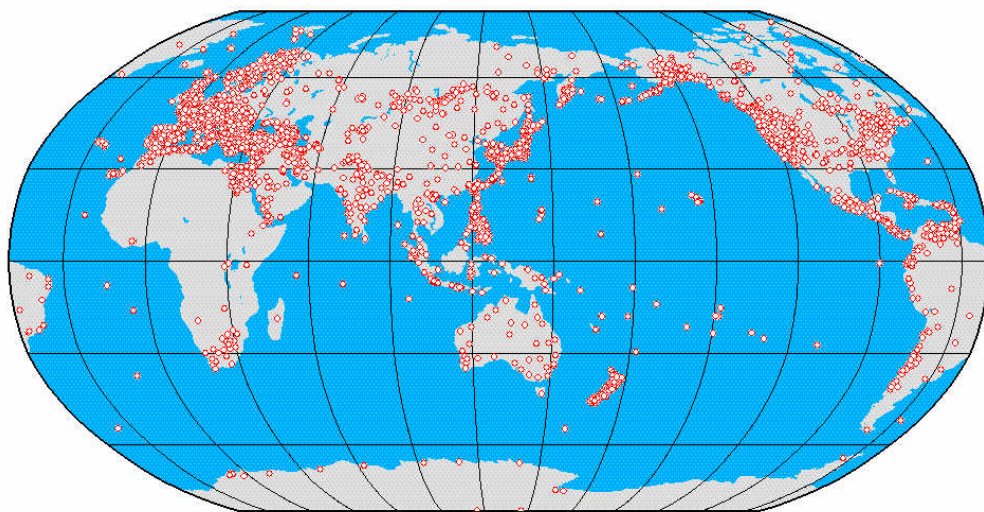
PLV - National Center for Scientific Research, Hanoi, Vietnam (resumed contributing data).

TEH - Tehran Observatory, Geophysical Institute, Tehran University, Iran

WAR - Institute of Geophysics, Polish Academy of Sciences, Warsaw, Poland. (New data from polar station HSP).



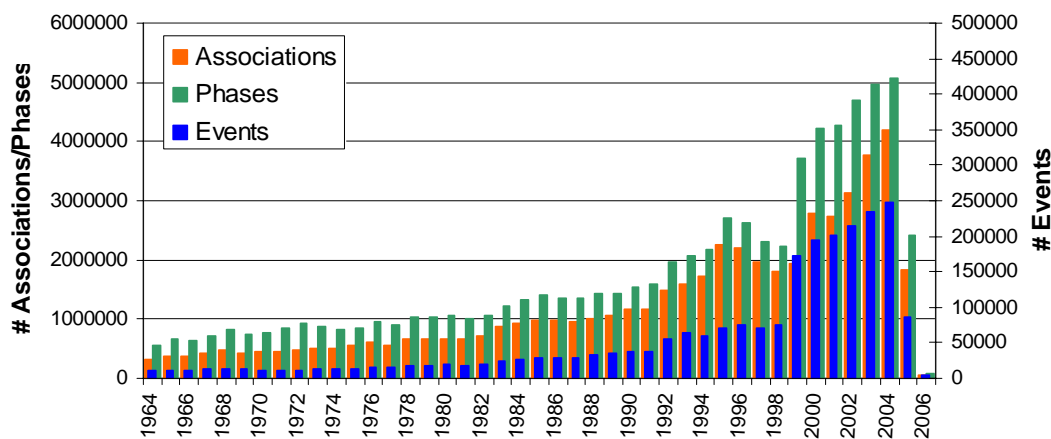
*Fig.2 : Seismological Agencies contributing data to ISC during 2005*



*Fig 3: Distribution of stations contributing data during 2005*

In comparison to the year 2004, we had a growth of 3.7 Gb to the 38Gb of seismological data in the database. 21 million rows of data added in total across all data tables (3.3Gb/17 million during 2004), which is an average 10% growth per year. In all, we have 17 million new rows of data entered into the database tables.

## ISC Data Collection

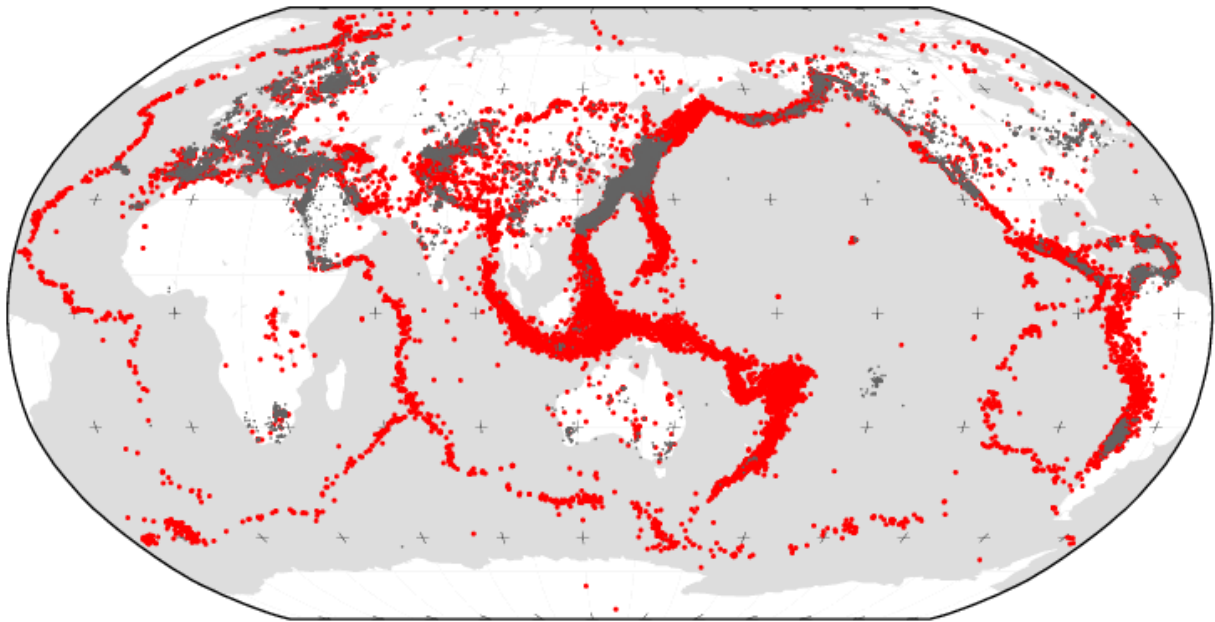


*Fig. 4. The annual number of events updated March 2006*

A major achievement in the course of upgrading ISC's software, was the implementation of new software that automatically re-groups seismic events and re-associates phase readings of continuously arriving data from data contributors. Thus, the comprehensive on-line *ISC Bulletin* is automatically and continuously updated. Peter Dawson, Richard Luckett, James Harris and Dmitry Storchak carried out this development work.

## Bulletin Review

During 2005 the ISC seismologists reviewed the data covering the period Jan.-Dec 2003. All events with maximum reported magnitude of 3.5 and larger, along with events with multiple network reports or stations reporting at distances more than 10 degrees, were analysed and where possible relocated. By completing the review for 2003, 233,046 seismic events have been added to the ISC *Bulletin*. 42,085 of them were reviewed and edited by ISC seismologists. Fig. 5 shows the seismicity of the Earth during 2003, and also indicates which of the depicted events was edited by ISC seismologists. The volume of seismological data from around the world is still increasing and consequently we again experience an increase in the number of detected and located seismic events and also an increase in the number of arrival time measurements (see Fig. 4) from which we determine earthquake locations. Note that data from earthquakes that occurred in 2004 and onward are still streaming into the ISC database. As demonstrated in the frequency-magnitude distribution (Fig. 6), the 2003 ISC Catalogue of earthquakes seems to be complete for all events at about magnitude 4 and above. Owing to station distribution, the detectability is slightly higher in continental areas and slightly lower in the oceans. The difference is in the order of 0.5 magnitude units.



*Fig. 5.* Earth seismicity during 2003. Red- Epicentres of earthquakes reviewed by ISC seismologists. Brown – Earthquake locations not reviewed by ISC seismologists

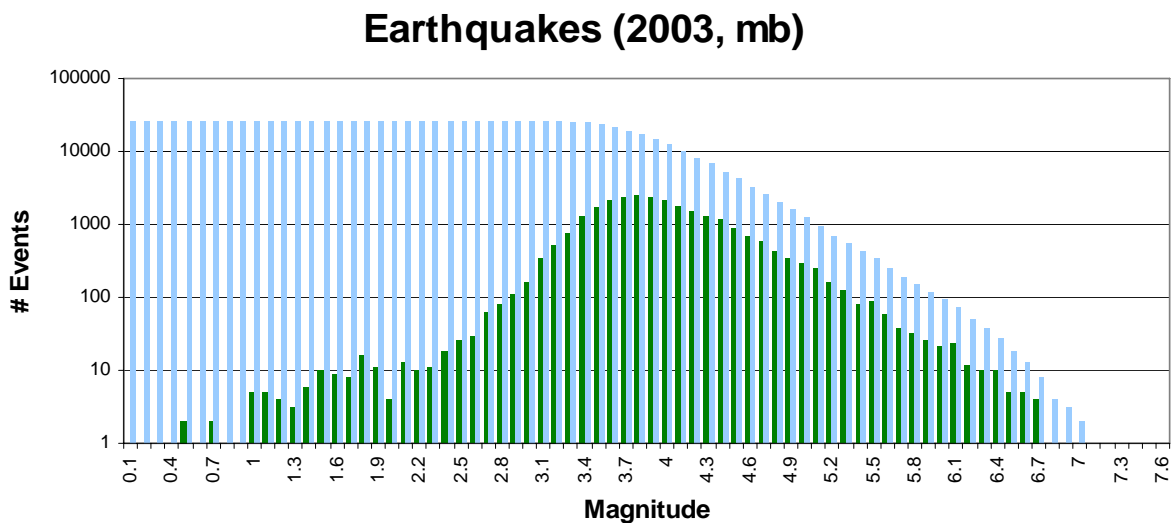


Fig. 6 : Frequency-magnitude distribution of earthquakes in ISC *Bulletin*.

Due to financial constraints and the length of time it took us to recruit a third seismologist, there has been an immense work load on ISC seismologists Dmitry Storchak (Chief Seismologist) and Maiclaire Bolton. Their great effort to limit the gap to 24 months, is highly appreciated. A more detailed analysis of the ISC Bulletin of 2003 is being prepared by ISC seismologists and will be posted on ISC web page.

### ISC website and FTP service

In 2005, there were over 1.3 million accesses to the ISC website, which is 29.5 % more than the year before and about 3.6 times more than in the year 2000. There were more than 80,000 accesses to the ISC website, searching for earthquake information, an increase of 15% compared with 2004. A breakdown of usage by country or domain is shown in Fig. 7.

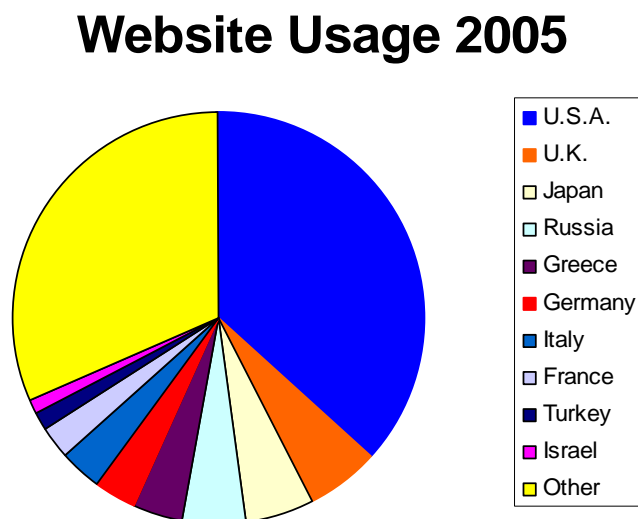


Fig. 7. Distribution of entries to the ISC website



ISC data is directly accessible and available at the ISC website [www.isc.ac.uk](http://www.isc.ac.uk). It should be noted that data are available to the scientific community as soon as it is made available to the ISC. Thus, information about strong earthquakes that is reported relatively quickly to ISC by local and regional seismological centres is made available on the ISC webpage long before it is added to the published ISC *Bulletin*.

The typeset monthly *Bulletins* and the semi-annual *Regional Catalogues* are also available as PDF documents. Users who browse the listings may find these typeset documents easier to use, and they include the separate lists of explosions and major events that have long been included in the *Regional Catalogue*. With the demise of the old Reviser system and the new ISCloc system coming into operation, it was necessary to generate the PDF *Bulletin* and *Catalogue* files directly from the ISC Oracle database. After some considerable effort by James Harris and Peter Dawson this has been achieved and all PDF files found on the ISC CDs are generated by the new software.

## **Additional on-line services**

In addition to providing on-line earthquake information, and as a service to the seismological community, the ISC provides other on-line information. The main services are:

### *International Registry (IR) of Seismic Stations and station book*

The International Registry of Seismic Stations is maintained jointly by the ISC and by the World Data Center for Seismology, Denver, which is operated by US National Earthquake Information Center (NEIC). The ISC, NEIC and the European-Mediterranean Seismological Centre encourage registration of all stations, regardless of whether or not the data seems likely to be widely distributed. The Federation of Digital Seismograph Networks recognises identification of parametric data with station codes from the International Registry and network code 'IR'. The ISC website ( <http://www.isc.ac.uk/IR/reg.htm> ) makes it convenient for network operators to add stations to the Registry.

An on-line station book service, added during 2004, complements the on-line station registration service. The station book is similar to the station book of the International Registry on-line at the NEIC. The web-based station book is in addition to the existing distribution of an ASCII text file of the station book through the FTP site and on the ISC CDs.

### *Bibliography of Seismology*

The Bibliography information provided on the ISC website continues still gains popularity. At present there are no references beyond 1996. Although on-line bibliographies are made available by the publishers of the main seismological journals, there seems to be a need for such information to be listed from less distributed publications such as national and regional journals. ISC aims for a joint venture with other seismological institution who might be interested in compiling the information and providing it on-line.

### *Shear Wave Splitting of SKS Phases*

Results from the automated shear wave splitting project, undertaken in collaboration with the

University of Leeds and performed by Matthew Evans is available on the ISC web site (see <http://www.isc.ac.uk/SKS> ). Matt left ISC in June 2005 to work at the AWE/Blacknest, UK. The Executive Committee of ISC met during the IASPEI-2006 conference in Chile and decided not to utilize the developed procedure on S/SKS splitting as long as there is no expertise at the ISC to supervise the automatically obtained results.

#### *Links to Rapid Earthquake Information*

The ISC has responded to the need to provide links to rapid earthquake information, especially for destructive earthquakes, and in 2005 introduced a new service <http://www.isc.ac.uk/realtime.html> that provides links to seismological data centres that provide this type of service.

#### *Contact list of Seismologists and Seismological Institutions*

In the aftermath of the great disaster of the Dec. 2004 Indonesian earthquake (and the tsunami that followed), the ISC took the initiative of preparing and maintaining a database that will list seismologists and seismological institutes who agree to serve as national contact points in case of emergencies associated with earthquakes (<http://www.isc.ac.uk/contact/index.html> ). The list contains names and addresses from more than 15 countries. This initiative is coordinated with IASPEI, the UNESCO and with the IUGG Commission on Geophysical Risk and Sustainability. The list has been extended to provide general contact information about seismological institutions and national data centres that operate in different countries.

The table below summarizes the main (most popular) services provided by ISC, the number of entries and the percentage variation when compared to the previous year.

<b>Service</b>	<b>Entries</b>	<b>Change</b>
Parametric data from the ISC Bulletin	~ 81,000	+15%
ISC Bulletin maps	~ 5,000	+25%
Seismic station information from the International Station Registry	~ 23,000	+130%
Bibliography	~ 6,000	+20%
Data from the bulletins of the data contributing agencies.	~ 5,000	+300%
Links to Real Time earthquake information	~ 3,000	
Links to Seismologists and seismological Institutions	~ 2,500	
Download of bulletin Data	15 Gb	+20%
Documentation on ISC Database	~ 5,000	
Documentation on Data Collection	~ 3,000	
Documentation about the ISC Location Workshop	~ 2,000	
ISCloc documentation	~ 1,500	
ISF documentation (PDF)	~ 1,000	
Director's Report for 2003	~ 1,000	
Documentation on ISC code	~ 500	

Table 1: Most used on-line services provided by ISC



Fig. 8 shows the distribution of entries and inquiries for data from the on-line ISC *Bulletin* since Jan. 2000, showing also the steady increase in retrieving ISC data over the Internet.

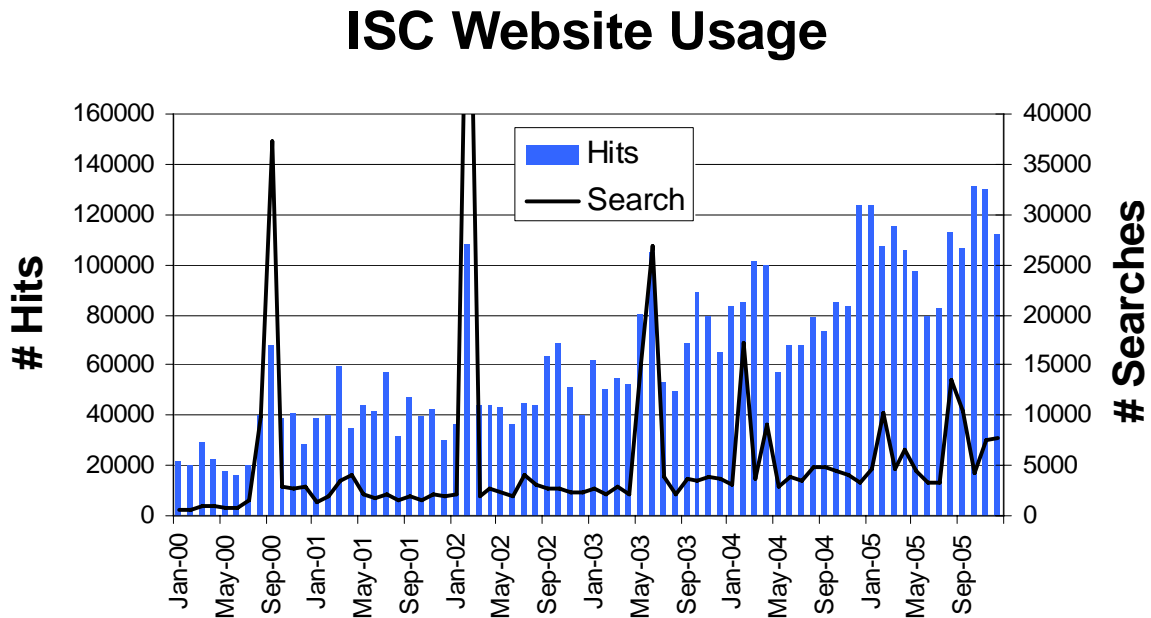


Fig. 8. Distribution of entries and inquiries for on-line ISC Bulletin data since Jan 2000.

### Improvements to the ISC web site

In 2005, using the funding made available by the Royal Society of London, Matthew Evans redesigned the existing content of the ISC web site in order to make it more user friendly and simple to add new content that may be of use to the academic community. Matt performed a page by page redesign of all existing content of the ISC web site. This involved:

- 1) A common header, footer and style sheet implemented for each page to make the site look more professional.
- 2) Content was categorised (e.g. all documentation appeared in the same directory), making the site much simpler to navigate. Images were also moved into a common directory.
- 3) Web pages that were not linked and/or had become redundant were removed.
- 4) Software was written to automatically update the site map and newsletter archive as new content was added.
- 5) All cgi scripts were updated to run from a Linux server.
- 6) Every internal link was checked to ensure it was still active and fixed where this was not the case. Relative links where found were also updated to absolute links for internal consistency.

### FTP service

An anonymous FTP server, <ftp://ftp.isc.ac.uk>, is used to allow prompt distribution of the results of the ISC's monthly analysis. These files are available very shortly after the completion of each month's editing and allow access to the results much more rapidly than the annual CD.

The year 2005 was a relatively "quiet" year for the FTP server, although the number of IP addresses visiting that server increased by 28% and reached 424 different addresses. About 13,600 FFB or ISF files were downloaded (a decrease of 20% compared to 2004) and 470 PDF files (decrease of 20%). There were 16 downloads of the ISCBUL program and 9 for the ISCloc program, a decrease of about 50% for both programs. About 280 people have downloaded the list of seismic stations, showing an increase of 75% for this service. The station list and the list of Reference Events (about 200 downloads) were possibly needed by researchers interested in the ISC location workshop that was conducted during the IASPEI – 2005 meeting in Chile.

### **Production and Distribution of printed ISC Bulletin and CD-ROMs**

Each year the ISC publishes a new volume of the *Bulletin of the ISC*. Each *Bulletin* encompasses four months of data and contains printed details of the events reviewed and relocated by the ISC seismologists. An accompanying CD-ROM contains the fully comprehensive *Bulletin* in FFB and ISF formats with all phase data included even for the smallest un-reviewed events, as well as the full reviewed *Bulletin* in PDF format for each of the four months. During 2005 we distributed the annual CD-ROMs of the 2002 data, the printed *Bulletins* of Sept.-Dec. 2002, Jan-Apr 2003 and May-Aug 2003.

### **Modernizing the ISC Location Procedures**

In response to the decisions and expectations of members of the GC, a workshop on the topic of Modernizing ISC Location Procedures was organized and was held during the IASPEI-2005 meeting in Santiago, Chile. The workshop was the result of the collective efforts of Johannes Schweitzer of NORSAR and Dmitry Storchak of the ISC, who were chairing the full-day session. The matter in question was how to modernize the ISC location procedure that has remained mostly unchanged for at least 30 years. ISC is still using the standard Geiger's least square solutions with Jeffrey's uniform reduction method of dealing with residual weighting and JB travel times.

In order to evaluate the results of using particular methods, the workshop contributors were encouraged to use the reference GT(0-5) event list, specially prepared by Bob Engdahl. The workshop participants suggested a number of solutions, but the most important request was to start modifications with the introduction of the AK135 travel time model in place of JB. The AK135 was shown by a large number of workshop contributors to provide locations which fit positions of the reference events better. Consequently, the IASPEI Assembly passed a resolution to suggest that data centres use the AK135 model to improve travel time estimations of seismic waves in the real Earth. Based on this, the ISC was asked to relocate a few months of its *Bulletin* and make the results available on its web-site, so that a thorough review could be made by interested colleagues on a regional basis with intentions to discuss the results at the second location workshop during the IUGG meeting in Perugia, 2007. Proceedings of the first workshop have been submitted to the journal *Physics of the Earth and Planetary Interiors* (PEPI).

## **Collaboration with IASPEI's Working Groups**

When applicable, ISC is trying to be instrumental in supporting IASPEI activities and implement its resolutions and recommendations. We are currently involved with the activities of the working group on Seismic Stations Code Names that was formed on the initiative of NEIC, EMSC and ISC to better characterize the station in the context of its deployment, to accommodate the need to better credit the owners, operators and data providers and to facilitate the integration of stations of small seismic arrays, temporal deployments and strong motion stations. Any change from the current coding system will have severe implications to seismological analysis software everywhere. Consequently, it will take some time before an agreement can be reached (see also web page [www.isc.ac.uk/stationcode/](http://www.isc.ac.uk/stationcode/)).

ISC is also collaborating with the Working Group for Reference seismic Events and is planning to be a focal point for collecting information, compile and maintain a data base of well located earthquakes and explosions.

IASPEI's working group on magnitude has summarized its recommendations. ISC will try to be instrumental in disseminating the approved recommendations among seismological centres and implement them.

## **Default depth determination**

Maiclaire Bolton, together with D. Storchak and J. Harris have initiated a discussion on the default depths to be used at ISC in the cases where the location procedures require the fixing of the depth. The main motivation is to replace the current practice of fixing the depth of assumed crustal earthquakes to 33 km or in multiples of 50km when assuming deeper foci. A preliminary concept was presented by Maiclaire during the IASPEI meeting.

The Bulletin of the International Seismological Centre and the Regional Catalogue of Earthquakes comprise a comprehensive and complete list of seismic events occurring globally along with their associated phase readings (arrival times of the seismic waves) for the period 1904-2003.

## **Donating ISC publications**

As a result of the generosity of the Royal Society of London and UNESCO (Paris), ISC has distributed its Bulletin and Regional Catalogue CDs to a select number of seismological institutions, who are otherwise unable afford it. This valuable data source was made available to seismological institutions around the world that have expressed interest in having these data. The need to share our knowledge has become particularly apparent following the earthquake and ensuing tsunami on 26<sup>th</sup> December 2004. We believe that the institutions listed below would benefit greatly from having almost 100 years of seismological data to hand.

The institutions supported by the UNESCO grant:

- |   |  |
|---|--|
| ❖ National Centre for Geophysical Research,<br>Lebanon    | ❖ Micro Seismic Studies Program,<br>PINSTECH, Pakistan |
| ❖ University of Malta, Physics Dept , Malta               | ❖ University of Paradeniya, Sri Lanka                  |
| ❖ Iraqi Meteorological Organization &<br>Seismology, Iraq | ❖ Geological Survey, Kingdom of Bhutan                 |
| ❖ Malaysian Meteorological Service,<br>Malaysia           | ❖ Meteorological & Geophysical Service,<br>Indonesia   |
|   | ❖ National University of La Plata, Argentina           |

The institutions supported by the Royal Society grant:

- ❖ National Survey for Seismic Protection, Armenia
- ❖ Seismology Survey of the Rep of Azerbaijan
- ❖ Dept. of Geology, University of Dhaka, Bangladesh
- ❖ Dept. de Geofisica, University of Chile
- ❖ National Research Institute of Astronomy and Geophysics, Egypt
- ❖ Geological Survey, Ethiopia
- ❖ South Pacific Applied Geosciences Commission, Fiji Islands
- ❖ Institute of Geophysics, National Survey for Seismic Protection, Georgia
- ❖ Kazakhstan Seismic Data Centre, Kazakhstan
- ❖ Mines and Geology Dept, Kenya
- ❖ International Research Centre, IRC-CPG, Kyrgistan
- ❖ Libyan Centre for Remote Sensing and Space Science, Libya
- ❖ Institute of Earthquake Engineering and Engineering Seismology, Macedonia
- ❖ The Geological Service, Madagascar
- ❖ Geological Survey Dept. , Malawi
- ❖ Research Centre of Astronomy and Geophysics, Mongolia
- ❖ The Geological Survey, Mozambique
- ❖ National Seismological Centre, Nepal
- ❖ Earth Science and Earthquake Engineering Centre, En Najah University, The Palestinian National Authority
- ❖ University of Damascus, Syria
- ❖ Tanzania Geological Survey
- ❖ Seismological Bureau, Thailand
- ❖ National School for Engineers, Tunisia
- ❖ Research Institute of Seismology, Turkmenistan
- ❖ Dept of Geological Survey and Mines, Uganda
- ❖ National Space Agency of Ukraine
- ❖ Mavlyanov Institute of Seismology, Uzbekistan
- ❖ Dept of Geodynamic, Inst of Geophysics National Centre for Natural Science and Technology, Vietnam
- ❖ National Seismological Observatory Centre, Sana, Yemen
- ❖ Geological Survey Dept , Zambia
- ❖ Geological Survey Dept , Zimbabwe

## Taking part in UNESCO Activities

The ISC was invited and supported by UNESCO to take part in its initiatives known as RELEMR (Reduce Earthquake Losses in the Extended Mediterranean Region) and RELSAR (Reduce Earthquake Losses in the South Asian Region). A. Shapira participated in the RELEMR meetings in Ankara, Turkey (Jan. 2005), Chania, Crete, (Sept. 2005) and in the RELSAR meeting in Xian, China, (Nov. 2005).

In co-operation with the European-Mediterranean Seismological Centre (EMSC), we are producing a RELEMR earthquake catalogue where ISC catalogue (1907-1997) and EMSC catalogue (1998 – 2004) are to be checked and verified by the local seismological agencies participating in the RELEMR.

A similar project was initiated for the RELSAR, using the ISC Bulletin as a reference. Mrs. V. Avirav of the Geophysical Institute of Israel has developed and kindly made available a program for Windows-XP that facilitates a comparison between the ISC catalogue and any local earthquake catalogue. (Copies are available by writing to either [veronic@seis.mni.gov.il](mailto:veronic@seis.mni.gov.il) or to [avi@isc.ac.uk](mailto:avi@isc.ac.uk) ). We trust that by encouraging re-examination of ISC solutions of events located within local seismic networks, we will eventually improve the reliability and accuracy of the locations of seismic events that are provided in the ISC Bulletin.

## **FINANCE**

The detailed financial statements of the ISC for 2005 were audited by Griffins-Chartered Accountants (Newbury, UK) and approved by Prof. John Woodhouse of ISC Executive Committee. These statements present the state of ISC's financial affairs as at 31 December 2005. The figures, quoted below, are not actual receipts and payments since the accounting is done on an accruals basis.

### **INCOME**

In 2005, ISC had a total income of £ 445,451 being national contributions and grants from the Royal Society of London (£ 44,725) and from UNESCO (£ 1,354) as well as the income from selling ISC publications. It is about 7.2% more than the 2005 budget that was approved by the ISC Governing Council.

In comparison with the year before, we had a 24% increase in total income, which can be largely attributed to the improvement in the \$/£ exchange rate that was 1.92 at the beginning of 2005 and 1.72 at the end of the year and the extra grants. Additionally, during 2005, the national contribution from China, made by the China Earthquake Administration, increased from 10 to 15 subscription units and three more members, each with one unit joined the ISC Governing Council: The Academia Sinica and the Weather Bureau in Taipei and Institute Nazionale di Oceanografia e di Geofisica Sperimentale in Trieste. At year-end, after 3 consecutive years, the membership fees from Argentina and Iran (AEOI) were unpaid and the contributions from these 2 organizations were written off.

Income from printed products fell by 30% from that of 2004. This decrease was anticipated as the computer-readable data is of more value to the seismological community.

### **EXPENDITURE**

About 70% of ISC expenditure is on personnel costs. These costs include: salaries, pension contributions, recruitment and repatriation costs. Salaries follow the UK academic salaries scales. Personnel costs were 14% less than the year before and ~18% less than planned due to the relatively long process of recruiting a new seismologist.

The expected increase in travel expenses, with respect to 2004, was primarily due to the long distance venue (Chile) of the IASPEI assembly.

Thanks to the grant received from the Royal Society we have replaced 3 PC and purchased a new A0 color printer and were accounted for in computer expenses.

### **RESERVES**

The excess of income over expenditure for 2005 was £83,260. ISC total reserves, comprising the cash in the bank, building and land, the money owed to ISC (debtors) minus the money ISC

owes (creditors and remaining mortgage on the building) increased during 2005 to £481,220. This amount includes the reserve funds of £30,000 set aside by the Governing Council for emergency use due to exchange rate losses and £ 70,631 for computer replacement funds that have increased during 2005 by almost £ 10,000 leaving ISC with a general reserve of £ 380,589 (equivalent to approximately 12 month's operation of the ISC). This is well within British guidelines for charitable organizations.

## CASH FLOW

The cash flow in Fig. 9 shows receipts and outlays using dates when transactions were recorded at the bank and the bank balances with US Dollars converted to Sterling using the exchange rate as of the end of each month.

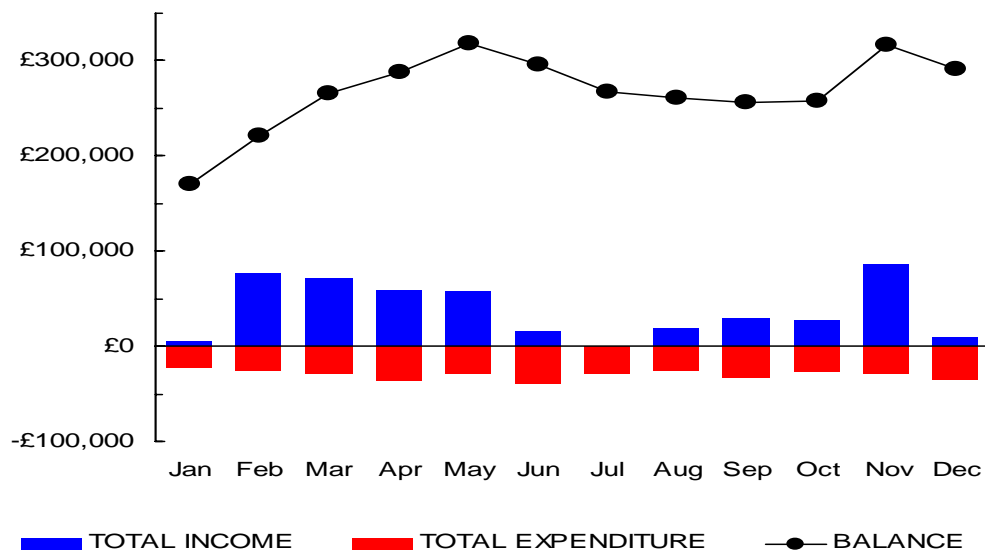


Fig. 9 Income/Expenditure cash flow and cash balance

The ISC maintains a £20,000 overdraft facility with the bank for emergency use if contributions are delayed. If other obligations need to be met then permission from the Governing Council chairman would be requested to use the exchange rate stabilization funds or the computer replacement funds kept in reserve.



## **ISC PARTICIPATION IN MEETINGS, WORKSHOPS AND CONFERENCES**

- Seismicity and Earthquake Engineering in the Extended Mediterranean Region, The 22<sup>nd</sup> meeting of the RELEMR initiative, Ankara, Turkey, January 2005. (supported by UNESCO)
- Annual meeting of the Israel Geological Society, Mashabe-Sade, Israel. April 2005 (supported by the Geophysical Institute of Israel).
- Annual meeting of the European Geophysical Union, Vienna, Austria, April , 2005. (supported by the Organizing Committee)
- International Symposium on the Geodynamics of Eastern Mediterranean. Istanbul, Turkey. June 2005. (Supported by the Organizing Committee)
- Cyber-infrastructure Summer Institute for Geoscientists Course, University of California, San Diego, USA, July, 2005. (supported by US-NSF)
- Utilization of Seismographic Networks within the Global Earth Observation System of Systems (GEOSS), Washington DC, USA. August 2005. (supported by USGS and IRIS).
- Seismicity and Earthquake Engineering in the Extended Mediterranean Region, The 23<sup>rd</sup> meeting of the RELEMR initiative, Chania, Greece, September 2005. (supported by UNESCO)
- Fifth International Workshop on Seismic Analysis in the South Asia Region, Xian, China. November 2005. (supported by UNESCO)
- Joint General Assemblies of European-Mediterranean Seismological Centre and the Observatories and Research Facilities for European Seismology (ORFEUS), Paris, France, September 2005.
- General Assembly of IASPEI, Santiago, Chile. October 2005. (supported by the Organizing Committee and by the Royal Society of London)
- Seminar on Earthquake Disaster Potential, Obidos, Portugal. November 2005. (supported by the University of Lisbon)
- Meeting of the American Geophysical Union, San Francisco, California. December 2005.

### **Visits by ISC personnel**

- The Pacific Geoscience Centre, Victoria, Canada.
- The National Earthquake Information Centre, Golden, USA.
- The IRIS Data Management Centre, Seattle, Washington, USA.
- The Geophysical Survey of the Russian Academy of Science, Obninsk, Russia.
- University of Cambridge, Cambridge, UK.
- Imperial College, London, UK
- The National Science Foundation, Arlington, USA.
- Bristol University, Bristol, UK.
- Oxford University, Oxford, UK.
- Atomic Weapons Establishment/ Blacknest, Brimpton, UK
- Society of Earthquake and Civil Engineering Dynamics, London, UK.
- The Royal Society, London, UK
- University of Chile, Santiago, Chile.
- Berggieshubel Seismic Observatory, Germany.

### **List of Publications Presentations and Reports 2005**

- Bolton, M.K., D.A. Storchak, and J. Harris. Upgrading default depths in the ISC bulletin. Abstract in: IASPEI General Assembly, Chile – CD-ROM
- Pinsky V., and A. Shapira. A Search for an Accurate Location Procedure Stable to Large Arrival Time Error. Abstract in: IASPEI General Assembly, Chile – CD-ROM
- Shapira, A. The International Seismological Centre. Abstract: Annual meeting of the Israel geological Society, Mashabe-Sade, 2005..
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