

The latest updates, news and activities from the ISC

ERI joins ISC to support development

The ISC continues to benefit from major financial support as well as preliminary and final bulletin data contribution from Japan Meteorological Agency (JMA) that for many tens of years remains the national member organization from Japan on the ISC Governing Council. In addition the ISC is benefitting from IFREE/JAMSTEC being an institutional member from Japan.

Following a request from Peter Suhadolc, the IASPEI General Secretary, the Earthquake Research Institute of University of Tokyo (ERI) joined the ISC as a new institutional member. ERI is a shared research institute in Japan. ERI joined the ISC in order for researchers from consortia of Japanese universities to benefit from consequent improvements in the ISC services and products. This consortium brings together Japanese universities that are involved in geophysical research, including Hokkaido University, Tohoku University, University of Tokyo, Nagoya University, Kyoto University, Kyushu University and others. We are grateful to professors Shuhei Okubo, Kenji Satake and Naoshi Hirata for their role in this important development.

Prof. Kenji Satake was appointed to serve as the ERI's representative to the ISC Governing Council. For a number of years ERI has been running a database and a search tool that allows university researchers to use various seismic bulletin data simultaneously from a number of sources and make a convenient graphical representation of the data. According to Prof. Satake, the ISC Bulletin is the next, after JMA, frequently selected source of seismic bulletin information by university researchers. The ISC and ERI are planning to look for ways to improve this service by making it more concurrent with changes in the ISC database that is an ultimate and most up-to-date source of the ISC Bulletin information.



Cooperation with LDG

Laboratoire de Detection et de Geophysique (LDG) of Commissariat a l'Energie Atomique (cea) has been a Member institution of the ISC for many years. During Dmitry Storchak's visit to LDG a number of avenues of further co-operation between ISC and LDG were discussed. One of them is to use facilities available at the LDG as a Centre of Excellence within the NERIES project. Following an invitation from the LDG, Juan Benjumea, the ISC's Seismologist/Developer went to work at the LDG with Jocelyn Guilbert. At the ISC Juan is predominantly working on the project to develop an automatic procedure to use waveforms available on-line for event depth and magnitude determination. A good leap forward was made during Juan's one month long stay at LDG. After his return, Juan is now experimenting with determination of the optimal depth using a grid search technique. He stretches the envelope of the waveforms at three-component stations according to the predicted ak135 pP-P moveout at each hypothetical depth and calculates the stack of the cepstrum across the entire network. The depth of the event is set to one where the stack is maximum. Further joint work with LDG in this direction is planned for 2010. The ISC is grateful to NERIES for funding Juan's travel and stay in France.

Following our request LDG also decided to increase its annual membership subscription that will contribute towards further improvement of the ISC services. We are grateful to René Crusem, Jocelyn Guilbert and Yves Cansi for their kind assistance.

Puerto-Rico joins the ISC

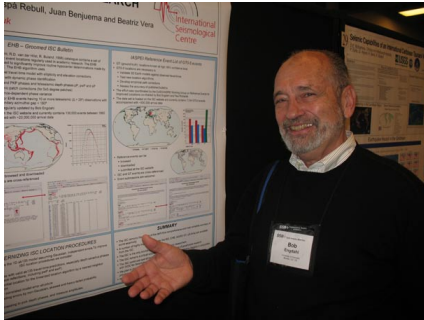


Puerto Rico Seismic Network (PRSN) of Department of Geology of University at Mayagüez has been contributing its seismic bulletin data directly to the ISC since 2001. PRSN appears to be one of only a few agencies that manages to complete its final analysis of the bulletin data within days of event occurrence. The Operations Coordinator at PRSN, Víctor Huérfano Moreno has always been popular with ISC Data Collection managers since PRSN data are always delivered on-time, in fact 12 months before the deadline. Following our invitation, the PRSN has decided to become the 58th Member Institution of the ISC. We expect that PRSN Director, Christa von Hillebrandt-Andrade will now take part in the 2011 ISC Governing Council meeting in Melbourne.

Three institutions are now members of the ISC in the Caribbean region: the Seismic Research Centre at University of West Indies in Trinidad and Tobago, the Jamaica Seismic Network of University of West Indies at Mona and finally the Puerto Rico Seismic Network. We are grateful to our colleagues in the region for their active support of the ISC operations.

SSA: EHB Bulletin released

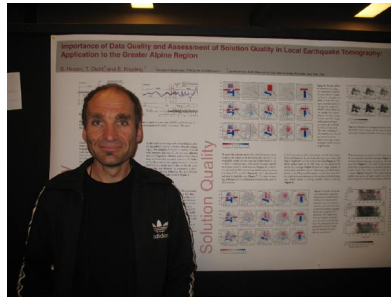
The 2009 annual meeting of the Seismological Society of America took place in Monterey, California in April 2009. István Bondár and Dmitry Storchak presented an ISC poster at the Session on New Developments in Seismic and Acoustic Monitoring of Earthquakes and Explosions. This poster presented the data sets recently made available by the ISC to the seismological community through the ISC website. We were delighted to announce that following an agreement with Bob Engdahl, the latest version of the EHB bulletin (Engdahl, van der Hilst and Buland, 1998) is now hosted at the ISC. The EHB hypocentres and phase readings can be searched and/or downloaded from the ISC website. This dataset is, of course, also integrated into the ISC bulletin as before. Users are able to see how the same natural events are represented in both the ISC Bulletin and the EHB database. At present the EHB covers the period between 1960/01/01 and 2006/12/31. In cooperation with Bob Engdahl, it will be regularly updated with more recent ISC and other data as these become available.



SSA, Portland, April 2009

Bob Engdahl gladly endorses the start of the ISC hosting and distributing the EHB catalogue and station arrival database from the ISC web-site. It is expected that the EHB will be updated by Bob as soon as each new ISC annual CD becomes available.

During the meeting several presentations stated their use of ISC data. The presentation of Stefan Husen (ETH, Zurich) advocated the use of consistent arrival picking techniques (and possibly the standardization of phase picking procedures) in order to make seismic bulletins more useful for tomographic studies.



Stephan Husen (ETH) beside his poster at SSA, showing the importance of consistency in station arrival picking techniques for seismic tomography.

Frontiers of Seismology



Left to right: Dmitry Storchak, István Bondár, Beatriz Vera, Juan Benjumea and Oriol Gaspà at the Frontiers of Seismology meeting in Edinburgh

An exciting exchange of ideas and views on recent developments in seismology was organized at the beginning of April by the staff members of Seismology Unit at British Geological Survey, Lars Ottemöller and Susanne Sargeant. The meeting entitled "Frontiers of Seismology" attracted the attention of leading research and professorial staff of a large number of UK universities, research institutions and engineering companies. Members of ISC staff gave talks on the current status and development plans at the ISC and also presented three posters describing recent achievements.

ISC analysts learn about the IDC REB production



Left to right: Baokun Li, Beatriz Vera (Lead analyst) and Elizabeth Robertson at the IDC office in Vienna

The International Data Centre (IDC) of CTBTO in Vienna has been contributing its entire Reviewed Event Bulletin (REB) to the ISC since its outset in Feb 2000. REB data is essential integral part of the ISC Bulletin and almost every single hypocentre and station/array measurement have since been reviewed by the ISC analysts as part of routine parametric data analysis at the ISC. It is therefore important for the ISC analysts to be aware of specific operational practices at IDC.

Following an invitation from the IDC Director, Mr Lassina Zerbo, three ISC analysts visited the IDC on 11-12 May. They were fortunate enough to arrive before the infamous nuclear test in North Korea and therefore received the full attention of IDC staff. They spend two working days with several IDC analysts performing day-to-day duties. Valuable in-depth knowledge obtained during the two day training at the CTBTO headquarters has helped the ISC analysts in making informed decisions whilst working on the ISC Bulletin.

RELEMR, NE Asia

The ISC is grateful to USGS and UNESCO for providing full travel support for the ISC to take part in both RELEMR meeting that took place in Lisbon in October and a similar meeting in North-East Asian region that took place in Beijing in December. On both occasions the ISC was given a unique chance to present its new developments and to discuss with local network operators, the possibility of recovering old seismic bulletin datasets that had not reached ISC at the time of original ISC Bulletin production.



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CTBTO-link project is progressing well



In 2008 the UK Foreign and Commonwealth Office (FCO) decided to fund at 90% level the ISC proposal to establish a secure and dedicated link to the ISC database for the CTBTO Provisional Technical Secretariat (PTS) and National Data Centres (NDC). Four geophysical institutions from Norway, Denmark, Sweden and Finland indicated a joint commitment at 10% level that secured the FCO's decision to start releasing the major bulk of funding to the ISC. The Link will enable the PTS and especially the NDCs to complement the IMS based seismic bulletin data with the abundance of data obtained by governmental and academic seismic networks around the world over a long period of time.

The project is almost half-way through now. A mirror of the ISC database has been set up by James Harris at a designated server at the ISC to be accessed by the States Parties to CTBTO through PTS in Vienna via a secure web-link. The ISC has also designed a first version of the software tool that will allow PTS and NDC personnel to perform predefined queries and run applications typical in the monitoring field. Oriol Gaspà, one of the ISC developers, successfully programmed the tool that later underwent stringent testing by both István Bondár and Dmitry Storchak.

In the last few weeks David Bowers from AWE Blacknest and then Bob Pearce and Jeffrey Given from the IDC visited the ISC to familiarise themselves with the tool. On both occasions useful advice was given and subsequently implemented. On December 10-11, Dmitry Storchak, István Bondár and Oriol Gaspà Rebull travelled to Vienna to meet with senior IDC management and technical personnel to demonstrate the capabilities of the tool and discuss its timely implementation next year.

The UK FCO grant is viewed as an initial investment to get the CTBTO-Link set up and operational within a fixed period of time. CTBTO will then be invited to evaluate the performance of the Link and its use by PTS and States Parties and consider the feasibility of supporting its maintenance as part of its operations.

SKS-splitting project gets a fresh start

Back in 2003, the University of Leeds undertook a project jointly with the ISC to automatically measure shear wave splitting with funding from the UK Natural Environment Research Council. Matt Evans, a Leeds student at the time, worked at the ISC on implementing a system to automatically measure "splitting" of SKS arrivals to be included into the ISC database. As shear waves propagate up from the core they may be split into vertically and horizontally polarised arrivals with slightly different onset times. This splitting has been interpreted as evidence of anisotropy in some parts of the mantle by many seismologists, including Matt's advisor at Leeds, Prof. Mike Kendall. The work on the project gradually came to an end when Ray Willemann and then Matt Evans left the ISC and Mike Kendall moved to Bristol University.

Following strong encouragement from the former ISC Executive Committee member, Dr. Jarka Plomerova from Geophysical Institute of Czech Academy of Sciences, the ISC has re-started the project. One of the ISC developers, Juan Benjumea, was assigned to take on this task in addition to his main duties.

At the end of May Jarka Plomerova flew to England from Prague to take part in the joint meeting at Bristol University with Mike Kendall, Andreas Wuestefeld, James Hammond and James Wookey and also Juan Benjumea, Istvan Bondar and Dmitry Storchak of the ISC. Discussion was held around the question of how to proceed with the project and what modernization would be required in view of more recent developments in the field of anisotropy studies. Juan Benjumea and Andreas Wuestefeld agreed to further discussions on the algorithm of distinguishing between records with no splitting and records where possible splitting may be masked by the high level of noise.

With guidance from Jarka Plomerova, Juan Benjumea was able to review the existing waveform retrieval software and identify even more sources of on-line waveform data that can be used to detect and report SKS-splitting parameters. He introduced a moving window technique into the analysis routines that he was able to discuss later with Mike Kendall during the Frontiers of Seismology meeting in Edinburgh. Juan is currently working on a set of routines providing an appropriate waveform quality control to assist this development.

Joint meeting at Bristol University; left to right, front row: Michael Kendall, Dmitry Storchak, Juan Benjumea, Jaroslava Plomerova and István Bondár; second row: James Hammond, James Wookey, Andreas Wuestefeld



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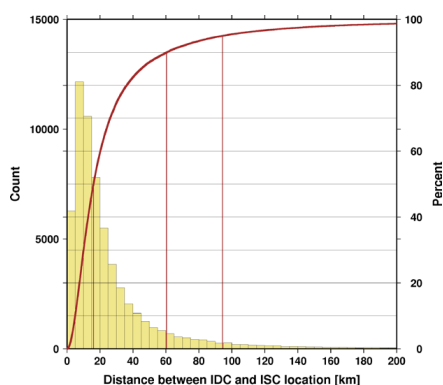
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ISS CTBTO Conference

The International Scientific Studies (ISS) Conference took place on 10-12 June 2009 in Hofburg Palace in Vienna, Austria. The conference was organized by CTBTO to discuss eight topic areas, Seismology being one. It provided scientists with a unique opportunity to present their analyses and findings concerning all aspects of the Comprehensive Nuclear Test Ban Treaty verification system. Barbara Romanowicz and Zhongliang Wu served as coordinators for Seismology for the ISS. Two key-note presentations on Seismology were presented in Vienna by Paul Richards of Columbia University and Dmitry Storchak of the ISC. Prior to this conference Paul Richards visited the ISC.

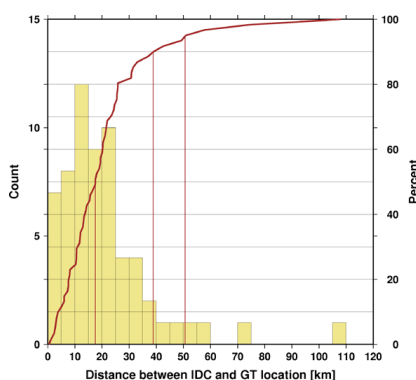
The ISC talk was entitled "CTBTO Contribution to the Global Earthquake Data Collection: a view from the International Seismological Centre (ISC)". IDC's Reviewed Event Bulletin (REB) remains a vital integral part of the ISC Bulletin. The IDC's major contribution to the ISC is in the oceanic areas where seismic network coverage remains poor. The summary of the recent IDC REB was given by studying the REB global completeness and location accuracy compared to both the ISC Bulletin and the IASPEI Reference Event List currently maintained at the ISC. CTBTO was invited to further contribute to scientific research and civil applications by providing an additional set of station amplitudes that would be compliant with the IASPEI recommendations. The presentation can be seen at www.isc.ac.uk/doc/analysis/papers.html

Locations of seismic events between May 2004 and April 2007 in the IDC REB compared with those in the ISC Bulletin (left) and in the IASPEI Reference Event List (GT0-5) maintained by the ISC



62,000 common events

Median distance – 16 km, max – 1662 km.
As many as 50% of IDC REB locations are within 16 km of corresponding ISC locations and as many as 90% are within 60 km of ISC.



62 common events

Median distance – 17 km, max – 108 km.
As many as 50% of IDC REB events are within 17 km of corresponding IASPEI GT locations and as many as 90% within 40 km of GT.

We are grateful to CTBTO PTS for financial support to participate in this Conference. This year the PTS also invited Dmitry Storchak and István Bondár to take part in two meetings held in February and November as part of ISS work in the field of Data Mining.

NEIC-ISC-EMSC Coordination Meeting

An annual NEIC-ISC-EMSC Coordination meeting took place in Golden, Colorado in September. Harley Benz, Stuart Sipkin, David Wald, James Dewey, Gavin Hayes, Dave Ketchum (USGS), Dmitry Storchak, James Harris, István Bondár (ISC) and Rémy Bossu (EMSC) received updates on operations and developments at each of three data centres. Topics of common interest were discussed: new international network and station registry, classification of event types, authoritative locations, macroseismic data exchange, magnitude determination, new NEIC publication policy and magnitude thresholds, new developments in the Hydra system at NEIC. We are grateful to NEIC for providing partial financial support to the ISC staff for this meeting.



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Fuzhou meeting

The Administration of Foreign Expert Affairs of Fujian Province of China invited the ISC Director to deliver a key-note presentation at the 2009 China Cross-Straits Symposium on the Prevention and Mitigation of Natural Hazards. The meeting took place in Fuzhou, the capital city of the Fujian Province, the most geographically close to the island of Taiwan. A large number of scientists from Fuzhou, Taipei and Beijing met together to discuss problems of common scientific interest and plan further joint projects. The ISC was happy to present its role in the region of putting together seismic bulletin information available from a number of research and operational institutions in several countries. The ISC advocated further improvements in the availability of data in the region.

During his stay in Fuzhou, Dmitry was able to visit the Fujian Earthquake Administration, give a talk and meet with the Director, Jin Xing, and his staff.

The ISC is grateful to Mr Cong Yuan Dong, the Director of Fujian Provincial Department of Personnel and also Mr Ye Jinshan, the Director of the Fujian Administration of Foreign Experts Affairs and Mr Chen Guohua for organizing and funding this visit.

We also would like to use this chance to mention that seismic bulletins from CWB in Taipei are now reported to the ISC in full, complete with all station arrival information. We are grateful to all colleagues in Taipei who assisted in this important development.

NSF & GEM Proposals submitted

July 2009 proved to be extremely busy because of the submission deadlines of two calls for proposals. Success or failure of these proposals will in many ways determine the way the ISC will develop in the near future.

The first was a 4-year operational support proposal to the US National Science Foundation (NSF) that usually provides approximately 21.4% of the ISC operational budget. In addition, the ISC also requested extra support towards running a mirror database and web-site at IRIS as well as a massive project of re-producing the entire ISC Bulletin for 1960-2009. The entire dataset is planned to be recomputed using a new ISC location program, ak135 velocity model, consistent magnitude computation procedures and additional data to fill the gaps in original network reports. Additional funding committed by member-institutions in Japan, China and India allows the ISC to start with this initiative, yet the NSF support, if given, will allow the work to be completed considerably sooner.

The second was a 2-year proposal to the Global Earthquake Risk Model (GEM) Foundation to compile a reference Global Instrumental Seismic Catalogue (1900-present) to be used for characterization of the spatial distribution of seismicity, the magnitude frequency relation and the maximum magnitude. To answer this call, the International Seismological Centre (ISC) has put together an international team of most experienced professionals in the field who are willing to contribute to this project and deliver the required product under the scientific coordination of Willie Lee (Emeritus Scientist, USGS) and in collaboration with the International Association of Seismology and Physics of the Earth's Interior (IASPEI).

Baokun Li returns to China



Baokun Li accepts a leaving present – a china bird made in England- that is ready to fly with her back home to Beijing

Baokun Li joined the ISC in September 2006. Prior to that Baokun Li worked at the newly established China Earthquake Networks Center (CENC) of CEA. For three years Baokun worked at the ISC as a Bulletin analyst. Her input proved invaluable whilst the training of new seismologists took place. Not only was a common native language useful but Baokun also helped to keep the bulletin analysis on schedule. Baokun also assisted her colleagues at CENC to improve bulletin data contribution to the ISC. As a result we now receive more data using the standard IASPEI approved format. Baokun decided to return to China to rejoin her husband and young daughter. She flew back to Beijing on the last day of October to find Beijing airport under snow.

PhD students at the ISC

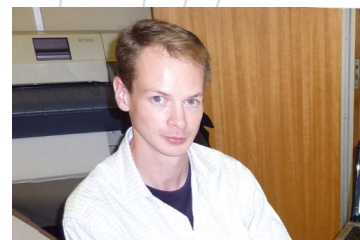
It is a good tradition set by one of the former ISC Directors, Ray Willemann, to accept MSc and PhD students willing to get a work experience by contributing to ISC's work or gaining from the ISC staff experience. Two PhD students, Louisa Tsang and James Bayliss worked at the ISC during the course of 2009.

Louisa Tsang has an MSc in Geophysics from Imperial College London. As part of her degree she spend a year at the University of California, Berkeley. Louisa asked about a work experience opportunity at the ISC during the summer months before starting her PhD course at the Department of Earth Sciences at the University of Hong Kong, working on the neotectonics of Tibet. Whilst at the ISC, Louisa studied earthquake locations in South-East Asia based on the newly received bulletin data. Louisa was assisted by James Harris, István Bondár and Dmitry Storchak in this work.

James Bayliss has worked at the ISC in the past. He is the author of the bar-coding software that is still used by the ISC analysts to review the ISC Bulletin. James is currently working at the UK Office for National Statistics and also doing his PhD at the University of East Anglia (UK), supervised by Paul Burton. James's thesis is entitled "Seismicity and large earthquake potential in southwest Bulgaria and the conterminous Balkan high hazard region". James has benefitted from using ISC computers and software and was helped in his work by James Harris, the ISC Systems and Database Administrator.



PhD students Louisa Tsang and James Bayliss have been enjoying their time at the ISC over the course of 2009



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Emily Delahaye and Shengzao Chen arrive

Two months before Baokun Li's departure from the ISC, two new seismologists arrived to help with the ISC Bulletin analysis. It was planned that in the foreseeable future the ISC will have four members of staff capable of reviewing the Bulletin. When fully trained the analysis team may be able to devote some of their time to development. In fact, all four, including Beatriz Vera, the Lead Analyst, have already helped Juan Benjumea in the performance testing of routine waveform quality control system. The ISC analysts will also be expected to help in identifying and obtaining new data-sets becoming available internationally. Some of the analysts will take the responsibility to communicate with the media in the time of large events once we have identified acceptable possibilities for appropriate training.

Our first new recruit was Ms Emily Delahaye, citizen of Canada. We received excellent references for Emily's previous work from GeoNet Project Manager, Kevin Fenaughty and Alison Bird, Seismologist at Geological Survey of Canada

Emily earned her B.Sc degree at the University of Victoria, Canada and then M.Sc degree at the Victoria University of New Zealand. For her Masters, she studied slow slip events in New Zealand. She also took part in field work deploying temporary seismic arrays and aided in expansion of the permanent national seismic network in New Zealand.

Emily has experience of working at the Pacific Geoscience Centre of Geological Survey of Canada where she updated the national catalogue and relocated some historical events using recent velocity models. Emily also worked as seismic analyst at GeoNet project in New Zealand. As a researcher she spent some time at the Geophysical Institute of Israel. Emily is the third Canadian citizen after Alison Bird and Maiclaire Bolton who both made an excellent input during their time at the ISC.



Emily Delahaye and Shengzao Chen are working together on the ISC Bulletin of September 2007

Our second recruit is Dr Shengzao Chen, who is known as Shawn by the USGS personnel in Golden, Colorado. Shengzao, originally from China, has dual citizenship of both United States and Canada. He earned his B.Sc degree from Peking University, M.Sc from Nanjing University and two PhD degrees from Nanjing University and also Carleton University in Ottawa.

Shengzao has experience of working on waveform analysis of mining induced seismicity at the Canadian Federal Laboratory (CANMET). At the Laurentian University in Canada Shengzao worked for the sonic and sonic/ultrasonic rock fragmentation project. He also worked on the earthquake source radiation spectra problem with Gail Atkinson and seismic hazard analysis at Geometrics Consultants as well as at the USGS. Shengzao studied deep crustal structure and geodynamics of China with Nanjing University as well as Institute of Geophysics of CEA. Lately he worked at the NEIC 24x7 Seismic Monitoring Project. Both Harley Benz and Bruce Presgrave highly recommended Shengzao for the analyst post at the ISC.

Both Emily Delahaye and Shengzao Chen are now undergoing training and are benefiting from advice given by Beatriz Vera, Baokun Li and Elizabeth Robertson during this process.



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Visitors to the ISC

Kevin Fenaughty, whilst on a private visit to ISC, checked up on two New Zealand trained members of ISC staff as well as making the acquaintance of John Eve, our Data Collection Officer, who has been nudging Kevin over the late data contributions from GeoNet. ISC expressed interest in receiving preliminary bulletins, access to GNS waveform archive for its development projects and also bulletins from temporary ocean bottom deployments around New Zealand. During his visit Kevin gave a presentation to the ISC staff on the recent developments at GeoNet.

We also had a pleasure of receiving John Adams from Geological Survey of Canada, Paul Richards from Columbia University and Reinhard Mittag from Bergakademie Freiberg, Germany.



Kevin Fenaughty, Emily Delahaye, John Eve and Elizabeth Robertson pictured after Kevin's presentation at the ISC on the developments at GeoNet in New Zealand

Essential building maintenance



The building in 1986, when it was first commissioned to house the operations of the International Seismological Centre

Thanks to the efforts of one of the former directors, Mr Anthony Hughes, the ISC is able to operate from its own building in West Berkshire. The ISC owns this building to a large degree since the outstanding building loan is relatively small. This has provided financial security yet this comes together with the responsibility to maintain the facilities that were originally built in 1986.

Following 23 years of operation the facilities have begun to show their age. This year ISC had to spend substantial amounts to fully replace the existing office lighting that caught fire a number of times and also was no longer compliant with UK electrical regulations. In addition, the entire heating system has been replaced, including the gas boiler, pipes, radiators and electronic controls. Notably normal ISC operations and development continued almost uninterrupted.

As 2009 comes to a close the staff at the ISC would like to wish all the Governing Council members, all of our data providers and our supporters very best wishes for the season and good luck for the New Year.



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