

Earth-prints: a geoscience open archive for open-minded geoscientists

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Abstract. Earth-prints (www.earth-prints.org) aims at satisfying the increasing demand of fast, up-to-date, easy-accessible, and free-of-charge sources of information in all branches of Geosciences. It allows earth scientists to deposit electronic documents into its collections and to index them by subjects and keywords. Earth-prints provides a time-stamp to all deposited materials to insure precedence rights to original ideas and scientific results. It deals with copyright issues through Creative Common standards that offer a wide variety of licenses. All deposited material is made immediately available to the public. Subscribers will be sent a daily newsletter according to the topics they have signed in.

Introduction

Istituto Nazionale di Geofisica e Vulcanologia is the largest European research institution in Geophysics and Volcanology. Its main mission is the study of geophysical phenomena in both the solid and fluid components of the Earth. This task includes the development and maintenance of monitoring instrumentation and research infrastructures, as well as real time surveillance and early warning. Libraries located in 7 branches, in Milano, Bologna, Pisa, Roma, Napoli, Catania and Palermo, since 2001 are organized in a network. The main goal of INGV libraries is to support research activities through the implementation of quality services and tools dedicated to researchers and to remote users. The libraries promote and develop electronic resources in the fields of geophysics and volcanology.

INGV cooperates with universities and other research institutions. One of the most important links is with PNRA Consortium (of which INGV is a member) in the frame of Italian research programs in Antarctica. The joint research activities are centered on geophysical observations and monitoring at Mario Zucchelli and Concordia Stations. INGV Central Library in Roma has a consolidated collaboration in terms of user-library services (i.e. document delivery and interlibrary loan) with the PNRA consortium central library. One of the activities jointly planned was the creation of a repository on Antarctic Sciences, with a section dedicated to Geophysics. After a year we created together a Geosciences Open Archive to emphasize the attention on Earth Sciences and related disciplines and to have a unique electronic tool to collect and disseminate information and documents on these subjects. This archive laid the foundations for the creation of Earth-prints.

Description of the project

In June 2005 we formed a working group composed by researchers and librarians from INGV and PNRA consortium. We defined the archive classification structure and the metadata following advanced information retrieval strategies. Being OAI-PMH compliant, our database supports the harvesting and guarantees the interoperability among data-bases.

We were convinced that promoting the public access to scientific results in the fields of Earth sciences can facilitate the dialogue between scientists and the public. It was also important to increase the impact of this specialized research.

In September 2005 the Earth-prints repository was opened to the public and to other institutions that developed research in Geophysics giving free access to documents during the search, retrieval and the submission process.

The mission of Earth-prints is to collect, harvest, disseminate, and preserve research results in the field of Atmosphere, Cryosphere, Hydrosphere, Solid Earth and Earth Sciences disciplines in general.

Its objectives are

- Promote an international repository dedicated to the collection of documents related to highly specialized subjects with a great impact for research and the protection from natural hazards
- Consolidate the impact of geophysical research on the general scientific community
- Create an efficient system and fast method to disseminate the original ideas preserving the intellectual property on the contributions
- Facilitate the communication and the dialogue between scientists of different countries (Multicultural open archive: title, abstract and key words in English are mandatory)

Characteristics

- The repository supports open access movement and it is based on a open source software (DSpace).
- The archive has a three-level hierarchical structure. The top level includes Atmosphere, Cryosphere, Hydrosphere, Solid Earth, and General. It then branches into several disciplines within the other two levels.

- Different collections accept different kinds of material, such as pre-prints, oral presentations, extended abstracts, published papers, conference papers, books and book chapters, posters, and Web products and databases.
- The main language is English, but the archive also accepts documents in other languages, giving visibility to data and studies at local scale that are indeed of general interests.
- The archive is based on latest information technology and does not require specific knowledge to be used because it manages all procedures for access, navigation, upload of documents and information retrieval through a user-friendly interface.
- Backstage organization in communities, representing INGV Sections, facilitates evaluation of the INGV products
- Different policies can be adopted for different communities with different administrators
- Guided submission of the contribution and help are online
- It is possible to activate a workflow for the metadata revision and the paper validation with different groups of experts and editors, according to the type of documents and to the affiliation of the submitter.
- Available online indices by author, title, year, journal title, kind of material etc.
- Free open access to documents, possible restriction for documents protected by publishers copyrights
- Registration for id and password necessary to submit an item

Technical features

- File formats: text, pdf, doc, avi, audio, tiff, jpeg, eps etc.
- Maximum dimension of the document archived: 10 Mb
- Daily alerting system by subject for registered users
- Creative Commons licenses can be added to archived documents
- Link to doi resolver and future connection to Paracite
- Information accessible and indexed by Google and Google Scholar ect.
- Detailed metadata description for different kinds of documents (personalized set of metadata related to the typology of the contribution)
- OAI-PMH compliant – the standard allows service providers to harvest metadata to organize sophisticated and specialized search engines (METALIS

<http://metalib.cilea.it/>)

- OAIS Open Archival Information System guarantees interoperability and stability of the archive to facilitate the long term preservation

After configuration of the database INGV librarians held frequent meetings with researchers, to explain the importance of open access to information, data and documents, and the efficiency of the free publishing process on the Web. We supported scientists in the self-archiving process, and demonstrated how the impact on their material was augmented up to 300% . The librarians-scientists meetings elaborated discussions on the copyright publishing constraints imposed by European and American publishers on papers submitted for publication, in print or already published. The debate also centered on the formal evaluation of the material published on the repository in case of competitive examinations and also on how to calculate the impact factor. Librarians guaranteed a helpdesk available to researchers during the publication process. We emphasized that deposited documents remain property of the authors. We monitored copyright politics through the SHERPA project data base and reported information to researchers. We also provided support on how to negotiate the copyright transfer agreement with explaining that was important to preserve the rights leaving to the editorial houses only the first publication permission. Preserve the rights on documents means self-archiving, teaching, disseminating the manuscript and publishing it again in other forms.

Users provided good feedback on the initiative and demonstrated interest by using the archive and promoting it with other colleagues. Another fundamental action of the working group was the promotion of the archive starting from the participation to geophysics and library science conference and meetings.

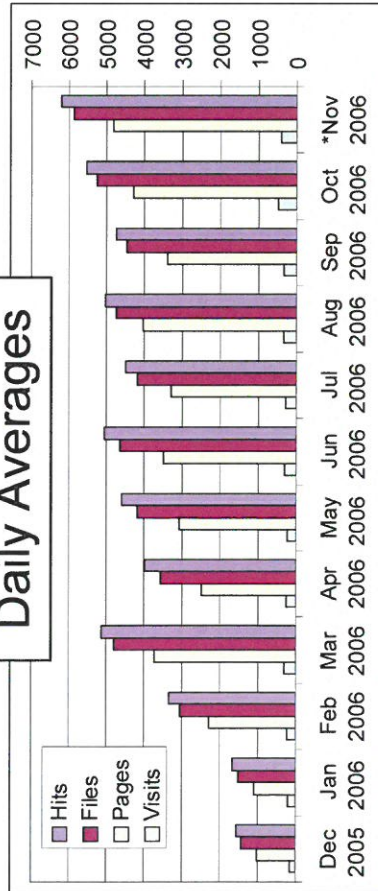
Librarians worked hard to find sponsors and partnership with other institutions.

At the end of 2006 1604 documents were published on Earth-prints.org: published articles inserted in the international journal *Annals of Geophysics*, post-doc thesis, pre-prints, data sets.

The archive is monitored by a statistics system showing that daily contacts are increasing every month.

A question remain open: What is the limit of open archive development? We think that the one and only limit of open archives is the eagerness of its users to share information and knowledge

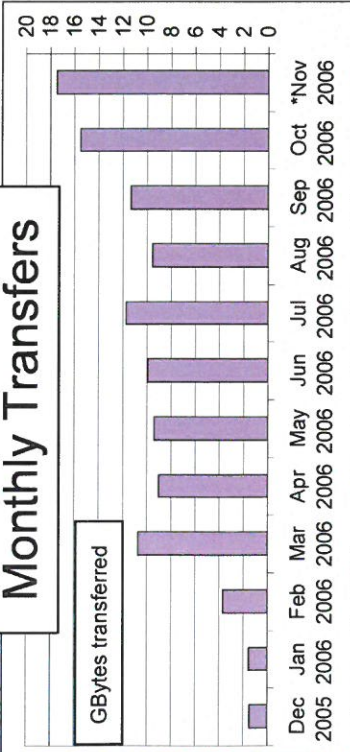
Daily Averages



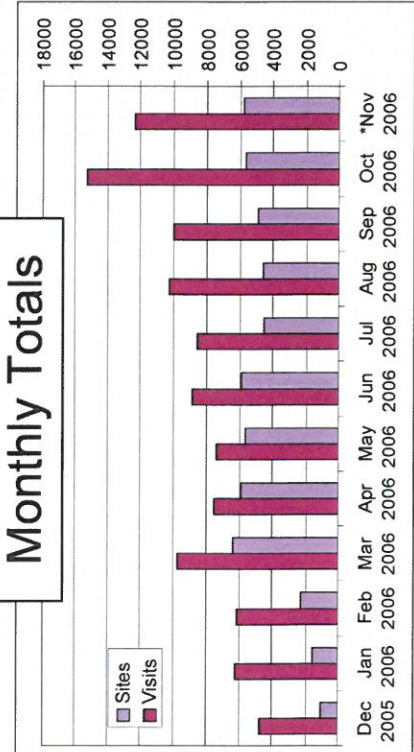
Most searched authors (14-26 Nov 06): Lombardo, V.,

Tiberti, M. M., Buongiorno, M. F., Merucci, L., Spinetti, C., Lancellotta, R., ...

Monthly Transfers



Monthly Totals



Top Ten Countries (Nov 06)

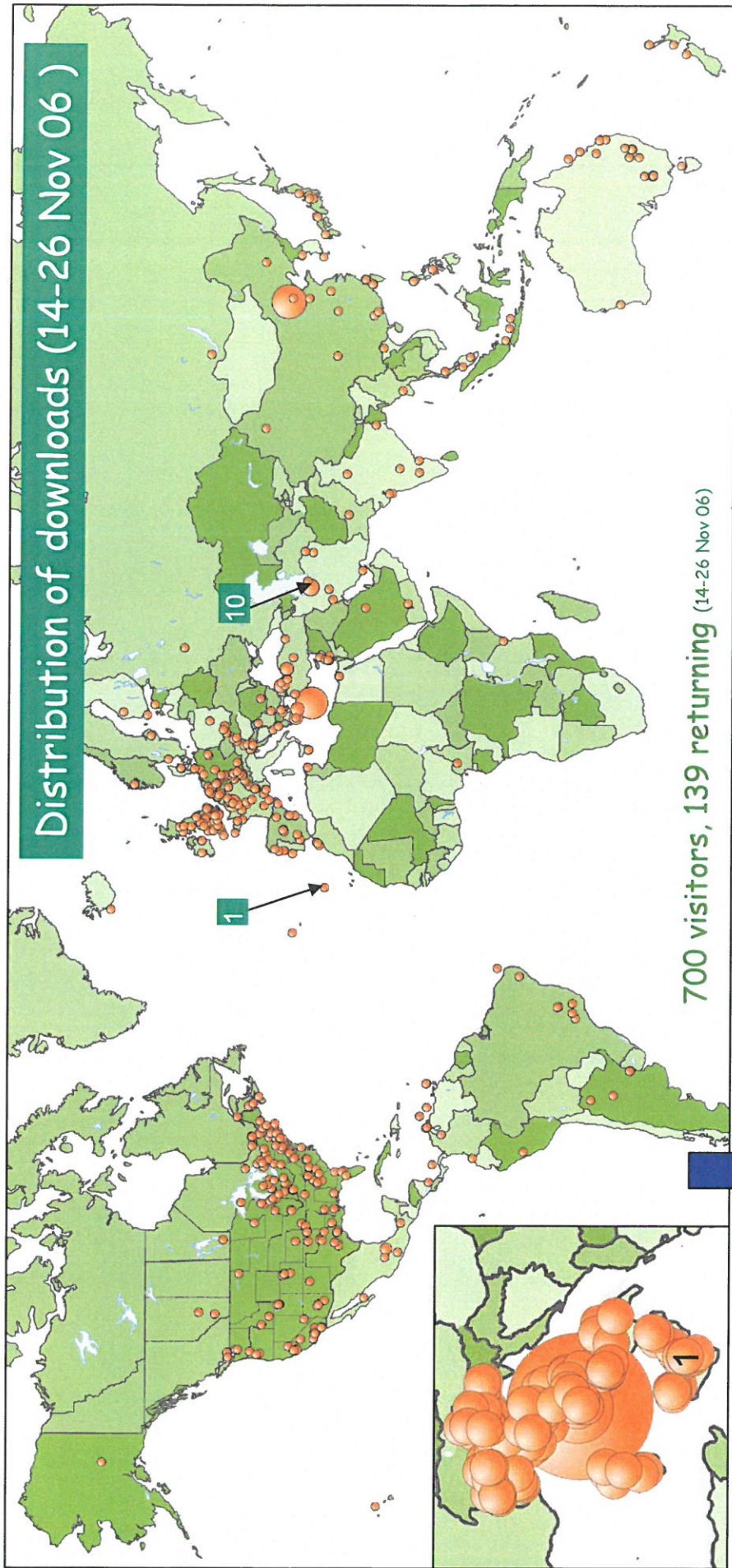
#	Hits	Files	KBytes	Country
1	90058	87351	8477445	US Commercial
2	40529	37801	3077977	Italy
3	13288	11693	1226008	Unres./Unkn.
4	5857	3633	726036	Network
5	1866	1155	445337	United Kingdom
6	1311	0.81%	108962	US Educational
7	1003	0.62%	147596	France
8	743	0.46%	37905	Japan
9	699	0.43%	49171	Netherlands
10	632	0.39%	94312	Germany

Top downloaded authors (14-26 Nov 06)

N	Authors	Title	Issue?	Year	Unique Views	Pages	Avg Time (s)	% Exit
1	Basili, R.	La componente verticale...	Ph.D. Thesis	1999	12	13	10	92.3
2	Viti, M. et al.	Quantitative insights into the role ...	Submitted	2006	7	10	20.57	30
3	ElAlami, S. O., et al.	The Al Hoceima earthquake of ...	Ann. Geophys.	1998	6	9	24.67	66.7
4	McCue, K.	Australia: historical earthquake studies	Ann. Geophys.	2004	6	6	0	100
5	Scoccimarro, E...	MATLAB and Practical Applications ...	CLARIS EU Proj	2006	5	7	34.6	28.7
6	Bellomo, S.	Environmental impact of magmatic ...	Ph.D. Thesis	2005	5	6	420.67	50
7	Mora, P. Et al.	Global Positioning Systems and...	Engin. Geol.	2003	5	5	0	100
8	Kouskoura, V. and...	Historical earthquake investigations ...	Ann. Geophys.	2004	5	5	69	60
9	D'Auria, L. et al.	10th September 2005: a bolide airblast ...	Unpublished	2006	5	5	163.5	60
10	Cubellis, E. and ...	Analysis of historical and present ...	EGU 06	2006	5	5	45	60
11	Bilham, R.	Earthquakes in India and the Himalaya...	Ann. Geophys.	2004	4	6	157	66.7
12	Aiuppa, A. et al.	H2S fluxes from Mt. Etna. Stromboli, ...	Geochimica et	2005	4	6	131	50
13	Pisani, A. R. et al.	Sumatra earthquake and Earth rotation	EGU 06	2006	4	4	31	50
14	Burrato, P. et al.	An inventory of river anomalies in ...	Ann. Geophys.	2003	4	4	0	100
15	Serpelloni, E. et al.	Data analysis of Permanent GPS ...	Ann. Geophys.	2006	4	4	0	100
16	Billi, A. et al.	First results from the CROP-11 ...	J. Geol. Soc. Lon.	2006	4	4	0	100
17	Adelfio, G. et al.	Southern-Tyrrhenian seismicity in ...	Unpublished	2006	4	4	22.75	0
18	Liotta, M.	Geochemical Processes Governing ...	Ph.D. Thesis	2003	4	4	143	75
19	Camassi, R.	Catalogues of historical earthquakes ...	Ann. Geophys.	2004	3	6	55.75	33.3
20	Valensise, G. and ...	Earthquake effects on the environment...	Ann. Geophys.	2000	3	5	14.33	40
21	Downes, G. L.	Procedures and tools used in the ...	Ann. Geophys.	2004	3	5	42	60

Statistics updated on 26 Nov 06; (*) extrapolated to 30 Nov 2006.

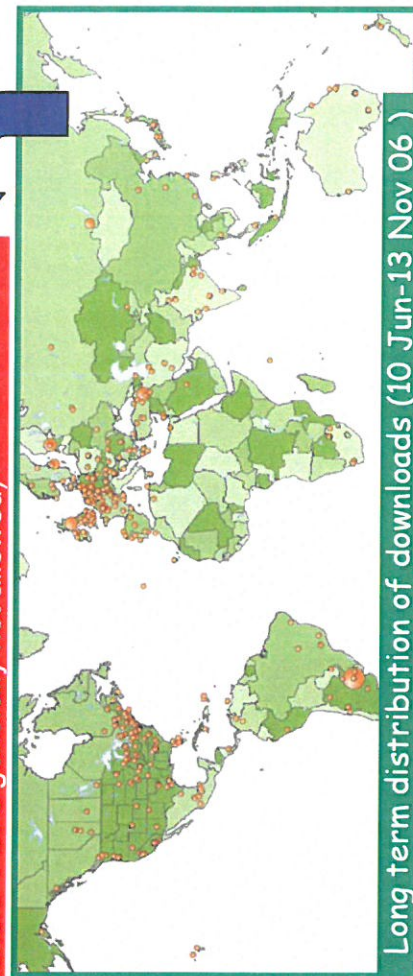
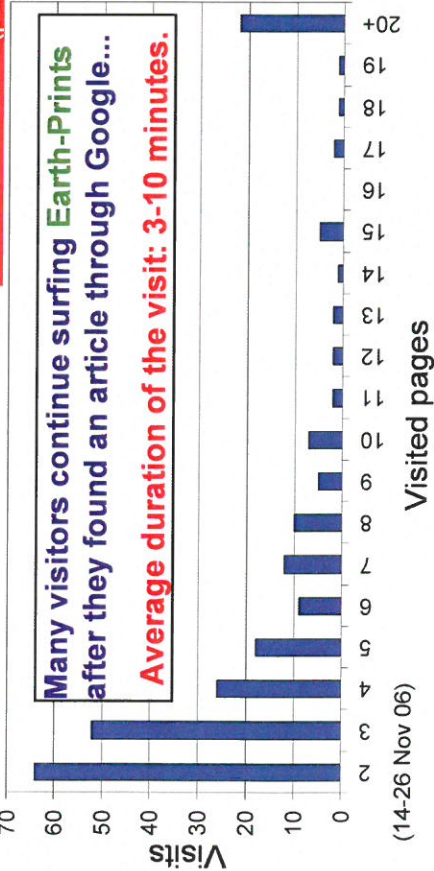
Distribution of downloads (14-26 Nov 06)



700 visitors, 139 returning (14-26 Nov 06)

Get visibility: deposit your manuscripts now!

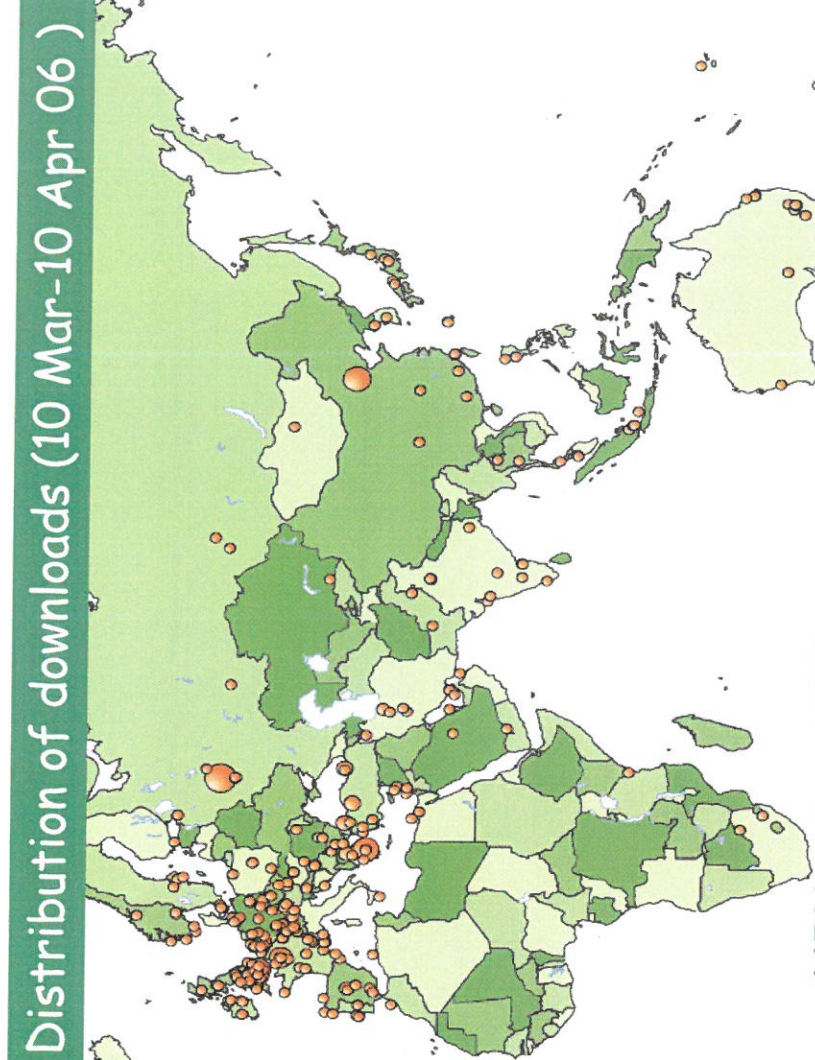
(publishers' PDFs generally not allowed)



Long term distribution of downloads (10 Jun-13 Nov 06)

Analyzed periods: 10 Jun-13 Nov 06 (long) and 14-26 Nov 06 (short).

Distribution of downloads (10 Mar-10 Apr 06)



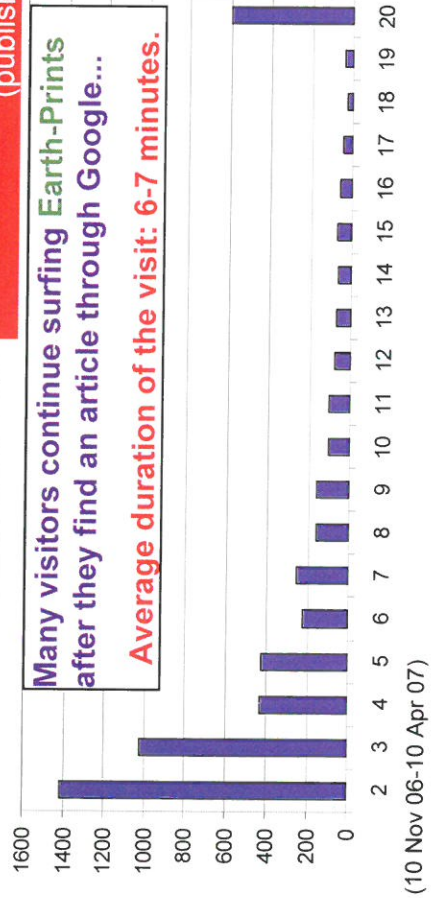
14581 visitors, 3191 returning

Get visibility: deposit your manuscripts now!

(publishers' PDFs generally not allowed)

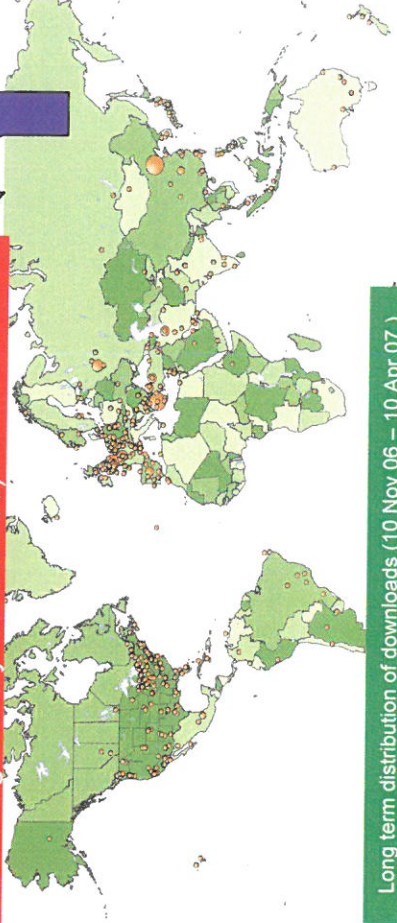
Many visitors continue surfing Earth-Prints after they find an article through Google...

Average duration of the visit: 6-7 minutes.



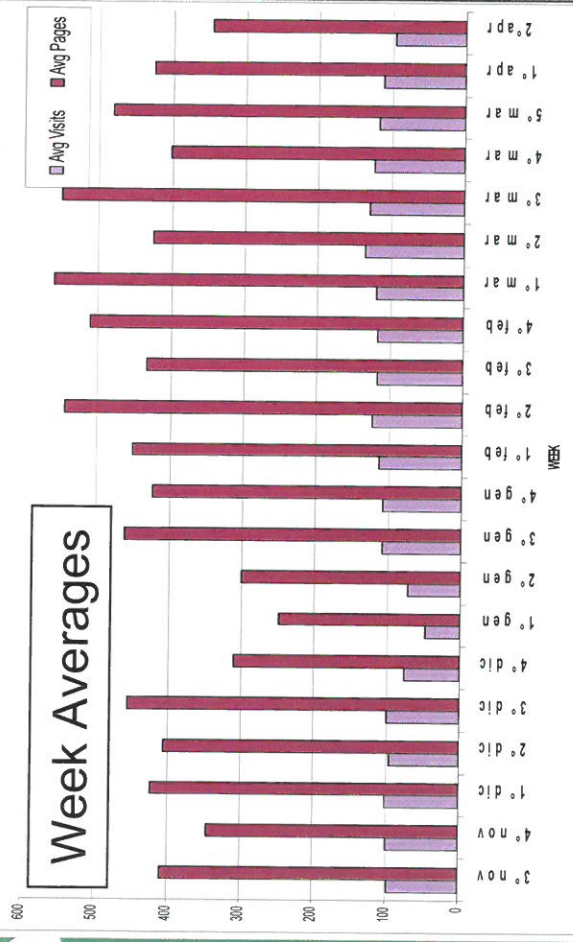
(10 Nov 06-10 Apr 07)

Long term distribution of downloads (10 Nov 06 – 10 Apr 07)

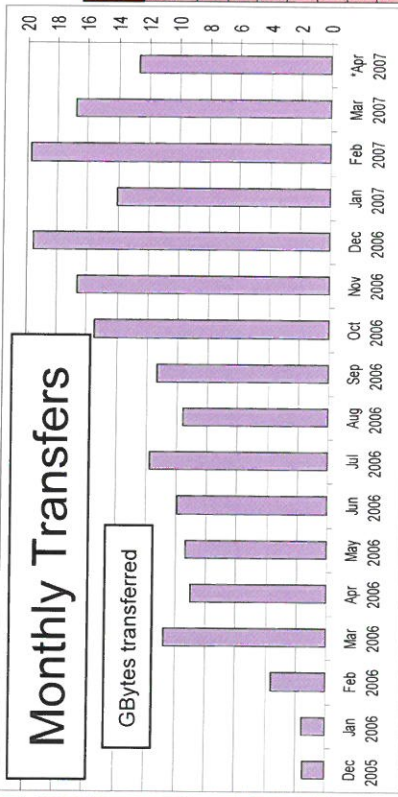


Analyzed periods: 10 Nov 07-10 Apr 07 (long) and 10 Mar-10 Apr 07 (short).

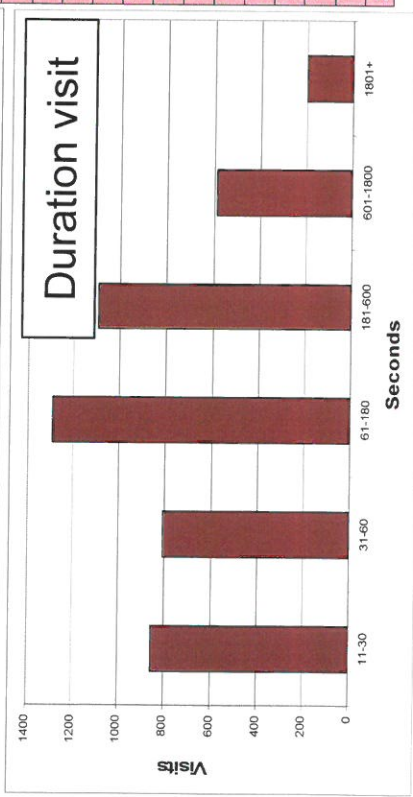
Week Averages



Monthly Transfers



Duration visit



Top Twenty Countries (Nov 06-Apr 07)

N°	COUNTRY	VISITS	PG/VISITS	%VISITS
1	Italy	5100	6.83	33%
2	United States	3261	2.07	21%
3	United Kingdom	1087	2.28	7%
4	France	512	3.18	3%
5	Canada	465	2.07	3%
6	Germany	434	2.44	3%
7	Australia	334	1.9	2%
8	China	288	2.58	2%
9	Greece	288	7.51	2%
10	Turkey	284	4.15	2%
11	India	270	2.33	2%
12	Spain	222	4.52	1%
13	Japan	213	2.83	1%
14	Russian Federation	154	6.71	1%
15	Iran, Islamic Republic of	148	3.8	1%
16	Netherlands	129	2.09	1%
17	Mexico	125	2.58	1%
18	Switzerland	120	3.45	1%
19	Brazil	112	4.27	1%
20	Philippines	108	2.16	1%

Top downloaded authors (10 Nov 06 -10 Apr 07)

N	Authors	Title	Issue?	Year	Unique Views	Pages	Avg Time (s)	% Exit
1	Basili, R.	La componente verticale...	Ph.D. Thesis	1999	228	256	134	79
2	Scocimarro, E...	MATLAB and Practical Applications...	CLARIS EU Proj.	2006	121	168	101	58
3	McCue, K.	Australia: historical earthquake studies	Ann. Geophys	2004	120	140	93	74
4	El Alami, S. O., et al.	The Al Hoceima earthquake of ...	Ann. Geophys	1998	106	123	96	80
5	Barba, S.	Studio dei meccanismi...	Ph.D. Thesis	1999	102	108	186	77
6	Toppozada, T. et al.	California earthquake history	Ann. Geophys	2004	94	114	207	74
7	Kokinou, E. et al.	Deep water prestack multiple...	Submitted	2006	92	142	106	43
8	Pecoraino, G. et al.	Total CO2 output from...	Geochemical J.	2005	89	97	122	84
9	Bellomo, S.	Environmental impact of magmatic...	Ph.D. Thesis	2005	86	100	151	65
10	Anzidei, M. et al.	The dark side of ...	Ann. Geophys	2006	84	97	88	46
11	Vfili, M.	Quantitative insights into ...	Submitted	2006	82	92	82	59
12	Mora, P. Et al.	Global Positioning Systems and ...	Engin. Geol.	2003	79	95	91	71
13	Pucci, S.	The Duzce segment of the North...	Ph.D. Thesis	2006	78	101	169	51
14	Baldi, P.	Application of Digital ...	Ann. Geophys	2006	69	80	64	59
15	Lambeck, K. Et al.	Sea level in Roman time	EPSL	2004	66	84	101	52
16	Etiopo, G. et al.	Melharne emission from ...	GRL	2002	65	80	158	61
17	Sbeinati, M. et al.	The historical earthquakes of Syria...	Ann. Geophys	2005	65	77	112	71
18	Anzidei, M. et al.	The high resolution bathymetric...	Ann. Geophys	2005	65	70	119	59
19	Mozco, P. et al.	Seismic response of the geologic...	Ann. Geophys	1985	64	69	253	78
20	Calvari, S. et al.	Birth, growth and morphologic evolution	JVGR	2004	62	66	154	88

Statistics updated on 10 Apr 07; (*) extrapolated to 30 Apr 2007.