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Worldwide outlook of geology journals: challenges in South America

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South American scientific periodicals are regarded as “obscure journals” due to their low visibility and difficult access. In an increasingly web-dependent world, the result is that a large amount of science produced locally in South America is ignored. How are globalization trends in scientific publications impacting on South American geology? A survey of nearly 400 geological journals and serial publications in South America was carried out to evaluate their present situation, with respect to publication status, publishers, periodicity and regularity, indexing and on-line access. Publications produced by societies are usually regular and timely and of relatively high quality. Publications from government organizations are mostly irregular in appearance and prone to frequent name changes that complicate bibliographic searches. South American Earth Science journals are rather poorly represented in international databases and abstracting services, but they fare better in regional databases, such as Latindex and Periódica. There are two large regional enterprises which provide free on-line access to some of the best journals: SciELO and Red ALyC, but the participation of Earth Science journals in these is still low. Many institutional web-sites make their own journals available immediately after printing, and there are a few fully electronic journals. Almost all on-line access is free and unrestricted, unlike that in the developed world where costs for access can be very high.

Introduction

Global trends in scientific publishing are changing many aspects of research and publication worldwide, but their effects are not equal around the world. Developed and developing regions differ considerably in their response to such trends and their level of adaptability to new publishing models. To understand these differences is important for an adequate evaluation and use of the existing sources of scientific knowledge. South American scientific periodicals are usually regarded as “obscure journals” due to their low visibility and difficult access. The unfortunate result in an increasingly globalized and web-dependent world is that a large amount of science produced locally is effectively “lost” (Gibbs, 1995).

There are several surveys on different aspects of Latin American scientific journals as a whole (see for instance Krauskopf and Vera, 1993; Cetto and Alonso Gamboa, 1998; Fernández et al., 1998; Krzyzanowski and Ferreira, 2001; CAICYT, 2006a; Luna-Morales and Collazo-Reyes, 2006), and some dedicated to particular scientific fields, but none has been carried out with respect to Earth Sciences.

The purpose of this article is to present an up-dated evaluation of the situation of Earth Science-related scientific publications from South America. A quick survey provides data from about 400 formal scientific publication titles related to the Earth Science in South America. Yet, only two of these are regularly covered by the Science Citation Index, although about a half are considered by other indices. The survey includes journals published by professional associations, universities and government institutions. They range from those exclusively local in scope, of irregular appearance and hardly to be regarded as periodicals, to those that are indistinguishable in coverage and editorial quality from similar ones produced in developed countries.

Materials

A comprehensive data-base was compiled and updated to June, 2009. It contains scientific journals published in South America (Guyanas excluded) by South American institutions or societies, most of them having an ISSN identification number. The survey does not include data from Mexico and the Caribbean region. All journals which may contain full articles on Earth Science subjects were included, and also both currently published and discontinued publications. On the other hand, conference proceedings, abstracts volumes and other occasional publications were not considered. Changes of journal title through time have been recorded if possible. Each entry includes data on name of journal, editor, country of production, main subjects covered, ISSN number, year of first publication, year of last publication (for closed series), periodicity, support, on-line data and indexing.

The main sources are on-line data bases, such as GeoRef (<http://www.agiweb.org/georef/index.html>), Latindex (<http://www.latindex.unam.mx/>) and Periódica (http://132.248.9.1:8991/F/-/?func=find-b-0&local_base=PER01), some good local university libraries: Biblioteca Florentino Ameghino, Museo de La Plata (<http://www.bfa.fcnym.unlp.edu.ar/>), and Biblioteca Leloir, Universidad de Buenos Aires (<http://www.bl.fcen.uba.ar/catalogos.php>) and printed data bases (ICSU AB, 1978).

The complete data-base is available on request from the author.

Characteristics of journals

The total number of journals arranged by countries (Fig. 1A) were

Figure 1. Histograms showing some characteristics of South American earth science journals, according to available data. **A.** Total number of South American publications including earth sciences articles and their continuity through time, arranged by country. Changes in journal name through time are regarded as different items, but journals with identical paper and on-line versions are regarded as one item. **B.** Publishers of South American earth sciences publications. "Government" includes geological surveys, universities and museums. **C.** Journals discriminated according to their declared regularity. Periodic journals are mostly published by professional societies, government journals are generally irregular series. **D.** On-line access of South American earth sciences journals by June 2009. On-line comprises those journals included in on-line libraries, in institutional web-pages, and also fully electronic journals.

also discriminated according to their actual continuity, a very difficult aspect to assess precisely, either because discontinued irregular series may be reinitiated at any moment, or because journal name changes are frequent for journals published by government organizations, such as geological surveys.

The publishers of Earth Science South American journals are mostly government organizations, such as geological surveys, academies, universities and museums (Fig.1B), followed by professional societies; private publishers are almost non-existent.

Local publication of geology-related scientific journals started in the second half of the 19th century in academic institutions, decades before the establishment of geological surveys: *Anales del Museo Argentino de Ciencias Naturales Bernardino Rivadavia*, Argentina (1864), *Arquivos do Museu Nacional*, Brazil (1876), *Anales del Museo Nacional de Chile, Tercera Sección: Mineralogía, Geología y Paleontología*, Chile (1883), *Boletín de la Sociedad Geográfica de Lima*, Perú (1891), *Anales del Museo Nacional de Historia Natural y Antropología*, Uruguay (1894), *Boletín de la Sociedad Geográfica*, Bolivia (1898). Historically, the appearance rate of these journals (Fig.2) shows three periods of unusual growth: (a) in the 1920's, just after the First World War, mainly due to the rapid increase in journal numbers in Argentina and Brazil and the establishment of local geological surveys; (b) in the 1950's and 1960's, just after the Second

World War, due to the appearance of new journals in Venezuela, Bolivia, Chile and Colombia, and rapid growth in Brazil; and (c) in the 2000's, due to the rapid growth in numbers of (mainly electronic) journals from Brazil. Although there are not enough data to quantify this aspect adequately, there is a steady rate of journal disappearance, especially during the last decade. On the other hand, on-line journals are gradually increasing.

Figure 2. Appearance rate of South American earth sciences publications (number of new publications per decade).

Contents quality

The quality of contents is very uneven. In some countries, great efforts are being made by local science organizations to overcome this situation and promote their best scientific journals to increase their quality and their national and international visibility. The scientific councils in some countries have developed local ranking systems for their journals, each with a large set of tight conditions, and they periodically follow a journal's performance according to periodicity and regularity, quality of editorial staff, editorial quality, formal aspects, distribution and access.

- Brazil: FINEP (Financiadora de Estudos e Projetos, Ministério da Ciência e Tecnologia), <http://www.finep.gov.br>, and CNPq (Conselho Nacional de Desenvolvimento Científico e Tecnológico, since 1980), www.cnpq.br/ (Vessuri, 1995; Cetto and Alonso-Gamboa, 1998). No detailed data are available. Also CAPES (Coordenação de Aperfeiçoamento de Pessoal de Nível Superior, Ministério da Educação) classifies scientific periodicals in several categories according to quality criteria, <http://www.periodicos.capes.gov.br>.
- Venezuela: Programa de subvención y evaluación del CONICEIT (Machado Alison, 1996), Revencyt: Índice y Biblioteca Electrónica de Revistas Venezolanas de Ciencia y Tecnología, Universidad de Los Andes (Revencyt, 1997) <http://www.revencyt.ula.ve>. Includes *Acta Científica Venezolana*, *Boletín de la Sociedad Venezolana de Espeleología*, *Boletín de la Sociedad Venezolana de Geólogos*, *Geominas*, *Memoria de la Fundación La Salle de Ciencias Naturales* and *Revista Geográfica Venezolana*.
- Colombia: Publindex: Sistema Nacional de Indexación y Homologación de Revistas Especializadas de Ciencia y Técnica Colombianas (Colciencias) (Gómez et al., 1998; COLCIENCIAS, 2005), <http://scienti.colciencias.gov.co:8084/publindex>. It includes a permanent indexation service in three categories: A: *Dyna*; B: *Boletín de Ciencias de la Tierra*; *Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales*; *Suelos Ecuatoriales*; and C: *Avances en Recursos Hidráulicos*; *Boletín Científico CCCP*; *Geología Colombiana*.
- Argentina: Núcleo Básico de Revistas (CONICET, Centro Argentino de Información Científica y Tecnológica) (CAICYT, 2006b) <http://www.caicyt.gov.ar>. Includes *Ameghiniana*, *Ciencia del Suelo*, *Geoacta*, *Latin American Journal of Sedimentology and Basin Analysis*, *Meteorológica*, *Publicación Especial de la Asociación Paleontológica Argentina*, *Revista de la Asociación Geológica Argentina*, *Serie Correlación Geológica*.

These ranking systems include only a very low proportion of all published journals (Fig.3). They are being used to choose which journals receive financial support by local science agencies, but they are not used to evaluate scientists' performance, as ISI indices are. The development and application of local ranking systems for science journals by national scientific agencies in Argentina, Brazil, Colombia and Venezuela has indeed resulted in better products, since editors try to meet the quality requirements.

Periodicity

Most items included in this survey are not periodical but irregular series (Fig.1C). Regular publication according to schedule is rare, even within the so-called periodicals, and regularity is highly

correlated with journals published by professional associations or societies. This is one of the basic conditions to be included in the local ranking systems, so this aspect is improving.

Change of journal name is also common, especially in publications of government organizations, like geological surveys or universities. The changes in name may be slight or more radical, and may be accompanied

by a change of ISSN number or not. They are recorded and followed as far as possible in the present survey. Furthermore, it is very difficult to know when a certain irregular journal or series is definitively closed. All these issues complicate bibliographic search and jeopardize visibility and access.

Indexing

Only two of the South American scientific periodicals related to Earth Sciences are indexed by Thomson Scientific-ISI (*Ameghiniana* and *Revista Geológica de Chile*, now *Andean Geology*). Several other South American journals meet the requirements (Testa, 2001) and yet they are not included.

ISI and other impact factors (IF) are currently being used to qualify the scientists' personal performance, and sometimes even to evaluate institutes and laboratories. The use and misuse of impact factors has been debated at length previously, especially in sciences characterized by territoriality, as geology clearly is (Kimley, 1994; Moed and Leeuwen, 1996; Avila, 1997; Hecht et al., 1998; Rey-Rocha et al., 1999, 2001; Riccardi, 2001; and many others) and is an important issue in itself. Riccardi (2001) and Granier (2007) discuss the matter specifically in relation to South American geological journals. This deflection from the original objectives of the indices has produced many unwelcome consequences for academic life in South America and elsewhere. There is pressure on local scientists to publish their results in the "listed" international journals, if they want to succeed in their academic goals. Thus, local geoscientists compete for the same editorial space with scientists from all over the world (Avila, 1997), although their results are commonly dismissed as being of "only local interest". This in turn produces a situation in which funds and efforts are channeled to "internationally interesting" fashionable subjects, neglecting the development of research areas which may have high local interest and social benefit.

This goes clearly against open access journals (see strong arguments referred to paleontology journals in Bengtson, 2000). To convince authors to publish good papers in local open access journals is a challenge for editors, especially in journals published by professional societies, which are cheap, have high technical quality and good IFs. The real presence and impact of these journals locally, regionally and internationally is not measured by currently used IFs (Urbizagástegui and Cortés, 1998; Martín-Sempere et al., 2000; Riccardi, 2001) and a new measuring method to evaluate this is badly needed. Cetto and Alonso-Gamboa (1998) have lucidly argued for

Figure 3. Proportion of currently published journals to those included by local science administration agencies in their ranking systems. Only data from Argentina, Colombia and Venezuela are available.

the need of developing standards and criteria that can realistically be used to measure or qualify our journals.

Visibility

The problem of visibility regarding Latin American scientific periodicals in general was acknowledged several years ago and has been the subject of many contributions (see for instance Ochoa-Henriquez, 2004). Global, regional and even national visibility of many of these journals is very poor, making access to the contents difficult and thus losing the main purpose of publication, i.e. to make the geological knowledge of our countries available to the world. Our publications are absent or very poorly represented in international databases and abstracting services, GeoRef includes about a third of the journals, and they are far less represented in other services (such as Geobase, Geological Abstracts, Pascal, INIS Atomindex, etc).

Some regional quality-selective data bases specialized in Latin American literature, on the contrary, have a good representation of Earth Science journals. These have recently been developed from Mexican initiatives, and comprise two data bases:

- Latindex:** Developed from Periódica (Cetto, 1998; Ratto and Dellamea, 2001) from an initiative during a meeting in 1994, member of the International Council of Science, Technology and Information (ICSTI). <http://www.latindex.unam.mx/>. It includes a directory of journal titles, a catalogue with selected journals and an index with bibliographic information. Member countries are Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Perú, Uruguay and Venezuela from South America (plus Costa Rica, Cuba, Guatemala, México, Nicaragua, Panamá, Puerto Rico, República Dominicana, Portugal and Spain), and it is sponsored by UNESCO and ICSU. It includes 259 South American Earth Science journals (updated to July 2009, see Fig. 4).
- Periódica:** Produced by the Universidad Nacional Autónoma de México from 1978 to 1997 in printed form (quarterly), on-line remote access from 1986 to 1993, in compact-disc from 1989 to 1994, and from 1997 in Internet http://132.248.9.1:8991/F/-/?func=find-b-0&local_base=PER01 (Alonso-Gamboa, 1998). It has very good coverage of Mexican literature, and is the base for the development of Latindex.

Figure 4. Sample visibility of South American Earth Sciences journals. Data include one international data base (GeoRef), one regional data base (Latindex) and a good local university library (La Plata Natural Sciences Museum). Data are compared with the total number of publications included in the survey.

A summary of the visibility by country according to different sources (GeoRef, Latindex, and the La Plata Museum library (Fig. 4) shows that Latindex has a fairly good coverage of Earth Science-related journals in the region.

Access

Distribution of hard copies: Usually distribution of hard copies of these local journals is restricted and irregular and does not reach the large libraries (see Fig. 4 for one sample library). This is made worse by the recent increase in postal fees, which may reach (or even surpass) the publishing costs.

On-line access: A simple frequency diagram shows that the proportion of publications available on-line is higher than expected (Fig. 1D), and that Brazil is doing significantly better than other countries. The situation is continuously changing and thus difficult to analyze quantitatively.

There are several types of on-line access for scientific journals: either the full text of printed journals is made available through on-line libraries or institutional websites which provide PDF files, or fully electronic journals are produced. All these types are found related to South American journals. Access can be unrestricted, free restricted, or paid, but it is free and unrestricted for all journals listed (Table 1).

Though few people would disagree with the principle of open access (OA), the practical question is how to make it work, since any publication system has costs (Butler, 2003; Grivell, 2004). Recent studies in particular scientific fields have shown that OA status of an article alone has little or no effect on citations (Craig et al., 2007).

Freely accessible geology journals on-line are usually heavily subsidized. According to the Budapest Open Access Initiative (2002) of the 43 Earth Science journals then freely accessible on-line, 7 (16%) were South American (either via SciELO or institutional web sites). Today (only seven years later) there are at least 100 South American Earth sciences journals freely accessible on-line (Table 1). This is relatively a very high proportion, considering the total contribution of South America to the publication in the field. Open access was received with high expectations in the developing world (BIREME/PAHO/WHO, 2005) but although these countries are making great efforts to provide open access to the scientific information they produce, they are still far behind the others in their own access to information produced in the rest of the world.

Libraries on-line: There are two regional virtual libraries which have a set of high quality standards equivalent to those used by the international indexing organizations for the inclusion of journals.

- SciELO (<http://www.scielo.org>): Scientific Electronic Library On-line. Originated in Brazil, now includes publications from Argentina, Brazil, Chile, Colombia, Perú and Venezuela (also Cuba, Spain and Portugal) (Packer et al., 2001; Packer, 2002), and is now expanding to include Paraguay, Uruguay and also Costa Rica, México and South Africa. It includes only 22 South American Earth Science journals from a total of 630 items and provides free access to PDF and HTML formats. In general, coverage is limited to a few recent issues, but is slowly growing. SciELO includes 4 Earth Science journals from Argentina, 7 from Brazil, 5 from Chile, 3 from Colombia, 2 from Venezuela and 1 from Perú.
- RedALyC (www.redalyc.org): Red de Revistas Científicas de América Latina, el Caribe, España y Portugal. With the rather radical motto “La ciencia que no se ve no existe” (science which is not seen does not exist), this project originated as a means to

Table 1. List of Earth sciences South American journals which are currently freely available on-line (most provide PDF files of published articles of at least some volumes) and their links updated to June 2009. When two ISSN numbers are available, only the on-line version ISSN number is listed.

Name	Country	ISSN	Link
Acta Científica Venezolana	VEN	0001-5504	http://acta.ivic.ve/ ; http://www2.scielo.org.ve/cielo.php?script=sci_issues&pid=0001-5504&lng=en&nrm=iso
Acta Geológica Lilloana	ARG	0567-7513	http://lillo.org.ar/content/blogcategory/93/118/
Acta Limnológica Brasiliensis	BRA	0102-6712	http://ecologia.icb.ufmg.br/~joseneto/Acta_Home/web/acta_limnologica.htm
Acta Scientiarum. Agronomy	BRA	1807-8621	http://periodicos.uem.br/ojs/index.php/ActaSciAgron
Águas Subterrâneas	BRA	0101-7004	http://ojs.c3sl.ufpr.br/ojs2/index.php/asubterraneas/issue/archive
Ameghiniana	ARG	1851-8044	http://www.scielo.org.ar/scielo.php?script=sci_issues&pid=0002-7014&lng=es&nrm=iso ; http://www.apaleontologica.org.ar/contenido/Inscripcion%20pag.php
Anais da Academia Brasileira de Ciências	BRA	0001-3765	http://www.scielo.br/scielo.php?script=sci_issues&pid=0001-3765&lng=es&nrm=1
Anales - Museo Nacional de Historia Natural y Antropología (Uruguay)	URY	0797-6828	http://www.mec.gub.uy/munhina/anales_lista.htm
Anales del Instituto de la Patagonia. Serie Ciencias Naturales	CHL	0716-6486	http://www.umag.cl/facultades/instituto2008_2.php
Andean Geology	CHL	0718-7106	http://www.scielo.cl/scielo.php?script=sci_serial&pid=0718-7106&lng=es&nrm=iso
Anuario de la Minería de Chile	CHL	0066-5096	http://www.sernageomin.cl/index.php?plantilla=categoria&option=com_content&task=section&id=5&Itemid=0
Anuário do Instituto de Geociências - Universidade Federal do Rio de Janeiro	BRA	0101-9759	http://www.anuario.igeo.ufrj.br/
Anuário Mineral Brasileiro	BRA	0100-9303	http://www.dnpm.gov.br/conteudo.asp?IDSecao=68&IDPagina=66
Aquatec	ARG	0327-7755	http://www.ilpla.edu.ar/ilpla/revistas.php?aq=1
Área Minera	CHL	0718-3704	http://www.aminera.cl/home/
Arquivos do Museu Nacional	BRA	0365-4508	http://acd.ufrj.br/~museuhp/CP/cp-arquivos.html
Avances en Recursos Hidráulicos	COL	0121-5701	http://www.minas.unalmed.edu.co/index.php?option=com_content&task=view&id=95&Itemid=223
BioScriba.org.ar	ARG	1850-4639	http://www.bioscriba.org.ar
Boletim de Ciências Geodésicas	BRA	1982-2170	http://ojs.c3sl.ufpr.br/ojs2/index.php/bcg/
Boletim de Geociências da Petrobrás	BRA	1982-2170	http://www2.petrobras.com.br/portal/frame.asp?pagina=/tecnologia2/port/publicacoes_bgeociencia.asp
Boletim de Pesquisa e Desenvolvimento - Embrapa Solos	BRA	1678-0892	http://www.cnps.embrapa.br/
Boletim de Pesquisa e Desenvolvimento Online - Embrapa Trigo	BRA	1677-8901	http://www.cnpt.embrapa.br/biblio/
Boletim de Pesquisa Online - Embrapa Trigo	BRA	1518-6504	http://www.cnpt.embrapa.br/biblio/
Boletim do Museu Paraense Emílio Goeldi. Ciências Naturais	BRA	1981-8114	http://www.museu-goeldi.br/editora/boletim_anteriorescn.html
Boletim Goiano de Geografia	BRA	1984-8501	http://www.revistas.ufg.br/index.php/bgg
Boletim IG - USP: Publicação Especial	BRA	0102-6275	http://geologiausp.igc.usp.br/geologiausp/arq/as_especial.htm
Boletim IG-USP. Serie didática	BRA	0102-6291	http://geologiausp.igc.usp.br/geologiausp/sd2/lv.php
Boletim Paranaense de Geociências	BRA	0067-964x	http://calvados.c3sl.ufpr.br/ojs2/index.php/geociencias/
Boletim Técnico de Petrobras	BRA	0006-6117	http://www2.petrobras.com.br/portal/frame.asp?pagina=/tecnologia2/port/publicacoes_bgeociencia.asp
Boletín - Instituto Geológico del Perú (IGP)	PER		http://www.ingemmet.gob.pe/form/plantilla01.aspx?opcion=104
Boletín Antártico Chileno	CHL	0716-0763	http://www.inach.cl/inachwebneo/index.aspx?channel=6212
Boletín Científico CCCP	COL	0121-3423	http://www.cccp.org.co/modules.php?name=Content&pa=showpage&pid=218
Boletín de Ciencias de la Tierra	COL	0120-3630	http://www.minas.unalmed.edu.co/index.php?option=com_content&task=view&id=96&Itemid=223
Boletín de la Sociedad Venezolana de Espeleología	VEN	0583-7731	http://www2.scielo.org.ve/scielo.php?script=sci_serial&pid=0583-7731&lng=en&nrm=iso
Boletín del Cuerpo de Ingenieros de Minas del Perú (CIMP)	PER	0366-1636	http://www.ingemmet.gob.pe/form/plantilla01.aspx?opcion=97
Boletín Minero - Sociedad Nacional de Minería	CHL	0378-0961	http://www.sonami.cl/
Bragantia	BRA	1678-4499	http://www.scielo.br/scielo.php?script=sci_serial&pid=0006-8705&lng=en&nrm=iso
Brasil Mineral	BRA	0102-4728	http://www.brasilmineral.com.br/BM/
Ciencia del Suelo	ARG	1850-2067	http://www.suelos.org.ar/publicaciones.htm
Comunicaciones Paleontológicas - Museo Nacional de Historia Natural y Antropología	URY	0374-7123	http://www.mec.gub.uy/munhina/compaleo.htm

Table 1. Contd...

Name	Country	ISSN	Link
Dyna	COL	0012-7353	http://www.minas.unalmed.edu.co/index.php?option=com_content&task=view&id=367&Itemid=223
Earth Sciences Research Journal	COL	1794-6190	www.geociencias.unal.edu.co/ESRJ.htm
Energética	COL	0120-9833	http://www.minas.unalmed.edu.co/index.php?option=com_content&task=view&id=99&Itemid=223
Estudos Geográficos: Revista Eletrônica de Geografia	BRA	1678-698x	http://cecemca.rc.unesp.br/ojs/index.php/estgeo/index
Estudos Geológicos	BRA	1980-8208	http://www.ufpe.br/estudosgeologicos/
FACENA	ARG	1851-507x	http://exa.unne.edu.ar/revisfacena/
GAEA	BRA	1808-5261	http://www.geociencias.unal.edu.co/publicaciones/detalle_dep.php?id=9&publicacion=250
Geo.br	BRA	1519-5708	www.degeo.ufop.br/geobr/
Geochimica Brasiliensis	BRA	0102-9800	http://www.sbgq.org.br/geochim/busca.php
Geociências (São Paulo)	BRA	1980-900x	http://jasper.rc.unesp.br/revistageociencias/
Geografia (Londrina)	BRA	0102-3888	http://www2.uel.br/revistas/geografia/ ; http://www.uel.br/revistas/uel/index.php/geografia
Geología Colombiana	COL	0072-0992	http://www.unal.edu.co/geociencias/RevistaGeologia.htm
Geologia USP . Serie Didatica	BRA	1677-7549	http://geologiausp.igc.usp.br/geologiausp/sd1/lv.php
Geologia USP. Publicação Especial	BRA	1676-7829	http://geologiausp.igc.usp.br/geologiausp/pe1/lv.php
Geologia USP. Serie Cientifica	BRA	1519-874x	http://geologiausp.igc.usp.br/geologiausp/sc1/lv.php
Geonomos	BRA	0104-4486	http://www.igc.ufmg.br/geonomos/conteudo.htm
Holos Environment	BRA	1519-8634	http://cecemca.unesp.br/ojs/index.php/holos
INGEOMINAS al Día	COL		http://www.ingeminas.gov.co/content/view/868/360/
Latin American Journal of Sedimentology and Basin Analysis	ARG	1851-4979	http://www.sedimentologia.org.ar/spanish/revista.html ; http://www.scielo.org.ar/scielo.php/script_sci_serial/pid_1851-4979/Ing_es/nrm_iso
Memorando - Instituto Nacional de Investigación y Fomento Minero (INIFM)	PER		http://www.ingemmet.gob.pe/form/plantilla01.aspx?opcion=105
Memoria Anual - INGEMMET	PER		http://www.ingemmet.gob.pe/form/plantilla01.aspx?Opcion=77
Minerales (Santiago)	CHL	0026-458x	http://www.iimch.cl/index.php?option=com_remository&Itemid=39&func=fileinfo&id=5
Miscelánea - INSUGEO	ARG	1514-4836	http://dgisrv15.unt.edu.ar/fcsnat/insugeo/publicaciones.htm
Multequina (Mendoza)	ARG	0327-9375	http://www.cricyt.edu.ar/multequina
Natura Neotropicalis	ARG	0329-2177	http://www.acnl.santafe-conicet.gov.ar/edic_nat.htm
Páramo	ECU	1390-1222	http://paramosecuador.org.ec/component/option,com_remository/Itemid,26/func,select/id,2/
Pesquisas em Geociências	BRA	1807-9806	http://www.pesquisasemgeociencias.ufrgs.br/index.htm
Publicación especial - Asociación Paleontológica Argentina	ARG	0328-347x	http://www.apaleontologica.org.ar/contenido/Indices%20Publicaciones%20especiales.php
Publicações Avulsas do Museu Nacional	BRA	0100-6304	http://acd.ufrj.br/~museuhp/CP/P.Avulsas/avulsas.html
Revista Ambiente e Água - An Interdisciplinary Journal of Applied Science	BRA	1980-993x	http://www.agro.unitau.br/seer/index.php/ambi-agua/index
Revista Brasileira de Agrociencia	BRA	0104-8996	http://www.ufpel.tche.br/faem/agrociencia
Revista Brasileira de Cartografia - RBC	BRA	0560-4613	http://www2.prudente.unesp.br/rbc/rbc.htm
Revista Brasileira de Ciência do Solo	BRA	1806-9657	http://scielo.br/scielo.php?script=sci_serial&pid=0100-0683&Ing=en&nrm=iso
Revista Brasileira de Geociencias - RBG	BRA	0375-7536	http://www.sbggeo.org/rbg_online.html ; http://ojs.c.s.l.ufrpr.br/ojs2/index.php/rdg/index
Revista Brasileira de Geofisica	BRA	0102-261x	http://www.scielo.br/scielo.php?script=sci_serial&pid=0102-261X&Ing=en&nrm=iso
Revista Brasileira de Geografia	BRA	0034-723x	http://biblioteca.ibge.gov.br/colecao_digital_publicacoes_multiplo.php?link=RBG&titulo=Revista%20Brasileira%20de%20Geografia%20-%20RBG
Revista Brasileira de Meteorologia	BRA	0102-7786	http://www.scielo.br/scielo.php?script=sci_serial&pid=0102-7786&Ing=en&nrm=iso
Revista Brasileira de Paleontologia	BRA	1519-7530	http://www.sbpbrasil.org/revista/index.htm
Revista Brasileira de Geomorfologia	BRA	1519-1540	http://www.ugb.org.br/home/?pg=10
Revista Chilena de Historia Natural	CHL	0717-6317	http://www.scielo.cl/scielo.php?script=sci_serial&pid=0716-078X&Ing=es&nrm=iso
Revista de Biología Marina y Oceanografía	CHL	0717-3326	http://www.revbiolmar.cl/
Revista de Geografía Norte Grande	CHL	0379-8682	http://www.scielo.cl/scielo.php?pid=0718-3402&script=sci_serial
Revista de la Academia Colombiana de Ciencias Exactas, Físicas y Naturales	COL	0370-3908	http://www.accefyn.org.co/PubliAcad/Periodicas/revista.htm
Revista de la Asociación Geológica Argentina	ARG	1851-8249	http://www.geologica.org.ar/ ; http://www.scielo.org.ar/scielo.php/script_sci_serial/pid_0004-4822/Ing_es/nrm_iso
Revista de la Ciencia del Suelo y Nutrición Vegetal	CHL	0718-2791	http://mingaonline.uach.cl/revistas/rcsuelo/eaboutj.htm ; http://mingaonline.uach.cl/revistas/rcsuelo/eaboutj.htm

Table 1. Contd...

Name	Country	ISSN	Link
Revista del Instituto de Investigación de la Facultad de Geología, Minas, Metalurgia y Ciencias Geográficas de la Universidad Nacional Mayor de San Marcos (Lima)	PER	1682-3087	http://www.scielo.org.pe/scielo.php?script=sci_serial&pid=1561-0888&lng=es&nrm=iso
Revista del Museo Argentino de Ciencias Naturales Nueva Serie	ARG	1514-5158	http://www.macn.secyt.gov.ar/cont_Publicaciones/pub_Rns-IndiceGeneral.php
Revista del Museo de La Plata (Nueva Serie). Sección Geología	ARG	0372-462X	http://www.fcnym.unlp.edu.ar/publi/revista/geologia.html
Revista del Museo de La Plata, Serie Técnica y Didáctica	ARG		http://www.fcnym.unlp.edu.ar/publi/revista/ptyd.html
Revista do Instituto Geologico	BRA	0100-929X	http://www.igeologico.sp.gov.br/dc_revista.asp
Revista Escola de Minas - REM	BRA	1807-0353	http://www.scielo.br/scielo.php?script=sci_serial&pid=0370-4467&lng=en&nrm=iso ; http://www.rem.com.br/web/
Revista Geográfica Venezolana	VEN	1012-1617	http://www.saber.ula.ve/regeoven/
Revista Geológica de Chile	CHL	0717-618X	http://www.scielo.cl/scielo.php/script_sci_serial/pid_0716-0208/ing_es/nrm_iso
Revista Técnica de Yacimientos Petrolíferos Fiscales Bolivianos	BOL	0375-7552	http://www.ypfb.gov.bo/revista_tecnica.php
SERGEOTECMIN Informa	BOL		http://www.sergeomin.gov.bo/boletin.htm
Serie Correlación geológica	ARG	1666-9479	http://dgisrv15.unt.edu.ar/fcsnat/insugeo/publicaciones.htm
Terrae - Geosciences, Geography and the Environment	BRA	1679-2297	http://www.ige.unicamp.br/terrae/
Terrae Didactica	BRA	1980-4407	http://www.ige.unicamp.br/terraedidactica/index.html
Zonas Áridas	PER	1814-8921	http://www.lamolina.edu.pe/zonasaridas/za11/ ; www.lamolina.edu.pe/ciza/

increase the visibility of Iberoamerican scientific production (Aguado-López and Rogel-Salazar, 2006). It has been developed since 2002 by the Universidad Nacional Autónoma de México, and includes complete texts of scientific articles published in the most important regional journals. It began covering only social sciences but from 2006 it includes also exact and natural sciences. It adheres to the Open Access initiative (RedALyC, 2007). The articles are all in PDF format.

Institutional free access: In many cases on-line access is made available by the publishing institutions directly. Again Brazil is leader in this aspect (Table 1), and there are Brazilian on-line libraries which facilitate quick access, such as Diretório de Revistas Brasileiras em SEER:http://seer.ibict.br/index.php?option=com_mtree&Itemid=109; and Portal LivRe do Centro de Informações Nucleares (Brazil): <http://livre.cnen.gov.br/Inicial.asp>

Discussion

The situation of Earth Science journals in South America is not good. It is not simply a question of low resources, but a serious issue of poor administration. Costs of publication of scientific results are only rarely included in science budgets, and thus the gap in scientific output between developed and developing countries is in fact greater than the input gap (King, 2004; Dickson, 2004).

Difficult access and low visibility are often closely related to (and may even be a consequence of) other serious structural deficiencies. Tackling these shortcomings is here regarded as the main challenge for editors of such journals: to obtain good manuscripts from local authors is certainly a key issue today. To create the conditions for

authors to prefer local journals for publication of good Earth Science papers is not an easy task, due to the widespread misuse of international "impact factors" (originally designed to evaluate journal impact) for the evaluation of scientists' personal performance, paradoxically by the same national science organizations that try to promote the local journals.

Since local evaluating organs favor publication in indexed media, some authors have even questioned if it is sensible to continue the struggle to publish in local journals. Others, including myself, believe that local Earth Science journals had and still have an important role in the development of regional geological knowledge (which is highly territorial by nature) and every effort should be made to preserve them, increase their quality and upgrade them to the current international publication trends. High quality journals published by learned societies should receive all available support.

Other important challenges for the continuity of local scientific publishing in Earth Sciences are to find a way of effectively measuring the real impact in the regional and international field, and to keep pace with new advances in publishing and communications technologies.

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