2019 Scientific Ocean Drilling Bibliographic Database and Publication Impact Report

Covering records related to the Deep Sea Drilling Project,
Ocean Drilling Program, Integrated Ocean Drilling Program,
and International Ocean Discovery Program
from 1969 through June 2019

Produced by
International Ocean Discovery Program
Publication Services

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Introduction

This Scientific Ocean Drilling Bibliographic Database and Publication Impact Report demonstrates the impact of Program science through publications from the Deep Sea Drilling Project (DSDP), Ocean Drilling Program (ODP), Integrated Ocean Drilling Program, and Intenational Ocean Discovery Program (IODP). The first section presents statistics from the bibliographic records indexed by the American Geosciences Institute (AGI) in the Scientific Ocean Drilling Bibliographic Database (previously named the Ocean Drilling Citation Database) as of June 2019. The second section covers alternative impact metrics. Citation statistics obtained from Google Scholar in July 2019 and links to Altmetric scores for high-impact papers demonstrate trends in societal relevance and research usage.

Report categories

Data collected for the annual Scientific Ocean Drilling Bibliographic Database Report are divided into two main categories:

- Program records: publications produced and published by the ocean drilling Programs DSDP, ODP, the Integrated Ocean Drilling Program, and IODP. These records include but are not limited to
    - The *Initial Reports of the Deep Sea Drilling Project*,
    - The *Initial Reports* and *Scientific Results Proceedings* volumes of ODP;
    - The *Proceedings* volumes of the Integrated Ocean Drilling Program (IODP-1) and IODP (IODP-2),
    - The technical note series from ODP and IODP, and
    - The journal *Scientific Drilling* from 2006 to 2013.
- Non-Program records: Program-related scientific research published in the open literature. Non-Program publications are further categorized into three groups:
    - Serial records: drawn from any periodically produced analytic or monographic journal or report, especially those that are peer reviewed, but may also include reports from universities, organizations, or government entities (e.g., *Open-File Reports—U.S. Geological Survey*).
    - Theses and dissertations: Bachelor's and Master's theses and Ph.D. dissertations.
    - Miscellaneous records: books, reports, monographs, maps, abstracts, posters, newsletters, videos, and CD-ROM/DVD-ROMs.

Scientific Ocean Drilling Bibliographic Database

The Scientific Ocean Drilling Bibliographic Database is a subset of AGI's GeoRef database. To generate the GeoRef database, AGI indexes and records bibliographic data from approximately 3,800 domestic and international publications. AGI also has arrangements to acquire metadata with many publishers including Springer, Elsevier, the American Association for the Advancement of Science, Copernicus, Wiley/Blackwell, the American Geophysical Union, and most of the Geoscience World publishers. In addition, IODP Publication Services notifies AGI when Program publications are released.

AGI produces the Scientific Ocean Drilling Bibliographic Database in collaboration with IODP. AGI uses a series of keywords to extract bibliographic records related to Program research from the GeoRef database. The database resides on the AGI server (**http://iodp.americangeosciences.org/vufind**) and

is updated weekly. Metadata associated with each record can be saved to a personalized list, texted or emailed, or exported into common bibliographic software. The database also generates references in several formats.

Depending on the source from which AGI acquires its information, there may be a significant delay after publication before a record is included in the GeoRef database and later in the Scientific Ocean Drilling Bibliographic Database. There is no guarantee that all publication venues for Program research are included in GeoRef or the Scientific Ocean Drilling Bibliographic Database, but scientific publications throughout the world are represented.

As of June 2019, the database contains 36,409 records, each including metadata, from publications published from 1969 to 2019 (beginning of DSDP to present), including ~73% non-Program records and ~27% Program records (Figure 1). Since the 2018 report, 1,399 records have been added to the database. Figure 1 highlights the ~2% theses and dissertations (total = ~745) in the database that illustrate early career scientific research relating to the Program and details serial publications related to IODP and its predecessor programs. Figure 2 shows these records based on all authors' country of affiliation. All maps in this report were generated using the Science of Science (Sci2) Tool (**http://sci2.cns.iu.edu**).

Figure 1. Overview of records in the Scientific Ocean Drilling Bibliographic Database as of June 2019 (total = 36,409).

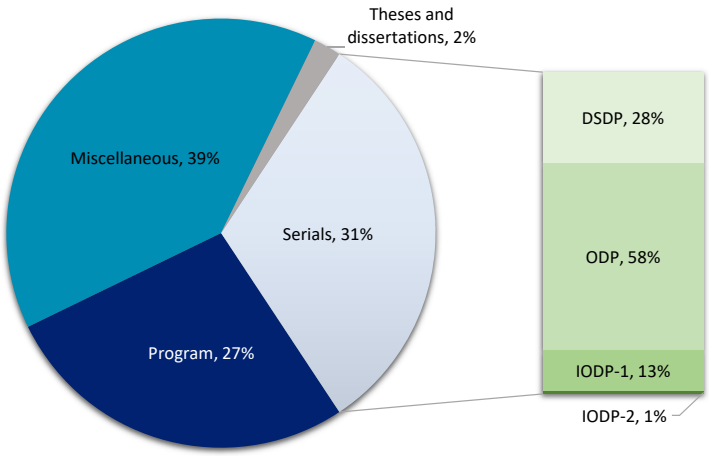
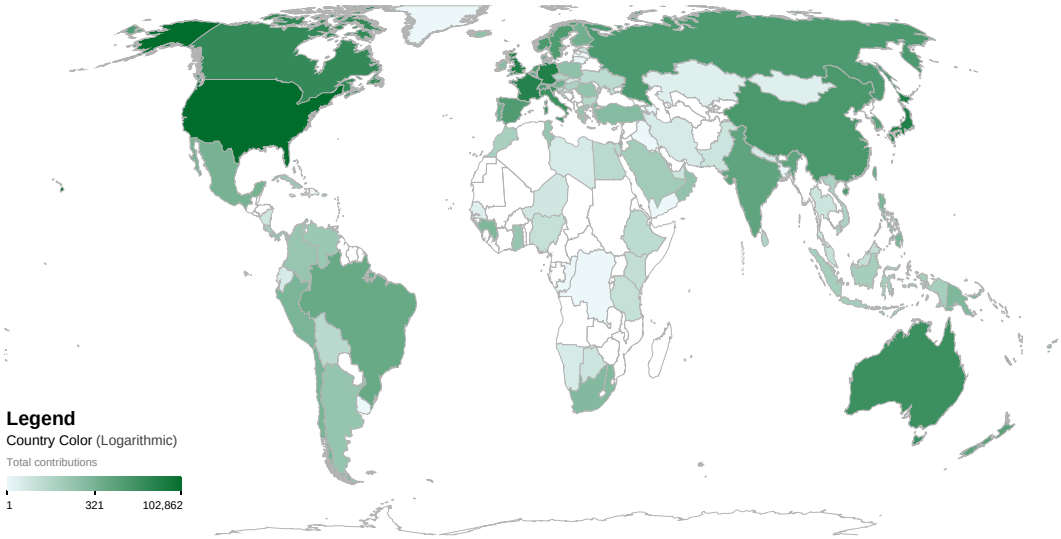


Figure 2. All records in the Scientific Ocean Drilling Bibliographic Database as of June 2019 by affiliation country of all authors.



All Programs (1969–2019)

Publications from top-ranking peer-reviewed journals

Database records indicate that 11,450 Program-related papers have been published in non-Program, primarily peer-reviewed serial publications. A total of 5,298 of these research papers (more than 50% of the serial publications in the database) were published in 30 highly ranked peer-reviewed journals, based on the Clarivate Analytics journal impact factor (Figure 3). Starting in 1996, ODP encouraged scientists to publish postcruise research results in English language peer-reviewed journals rather than the Program *Proceedings* volumes. Approximately 83% of the papers illustrated in Figure 3 are Program-related research results that have been published in top-ranked journals since 1996, the year the publication policy change took effect. Table 1 presents the data behind this graph and includes the impact factor for each journal.

Figure 3. Highly ranked peer-reviewed serials publishing Program-related expedition research results (1969–2019).

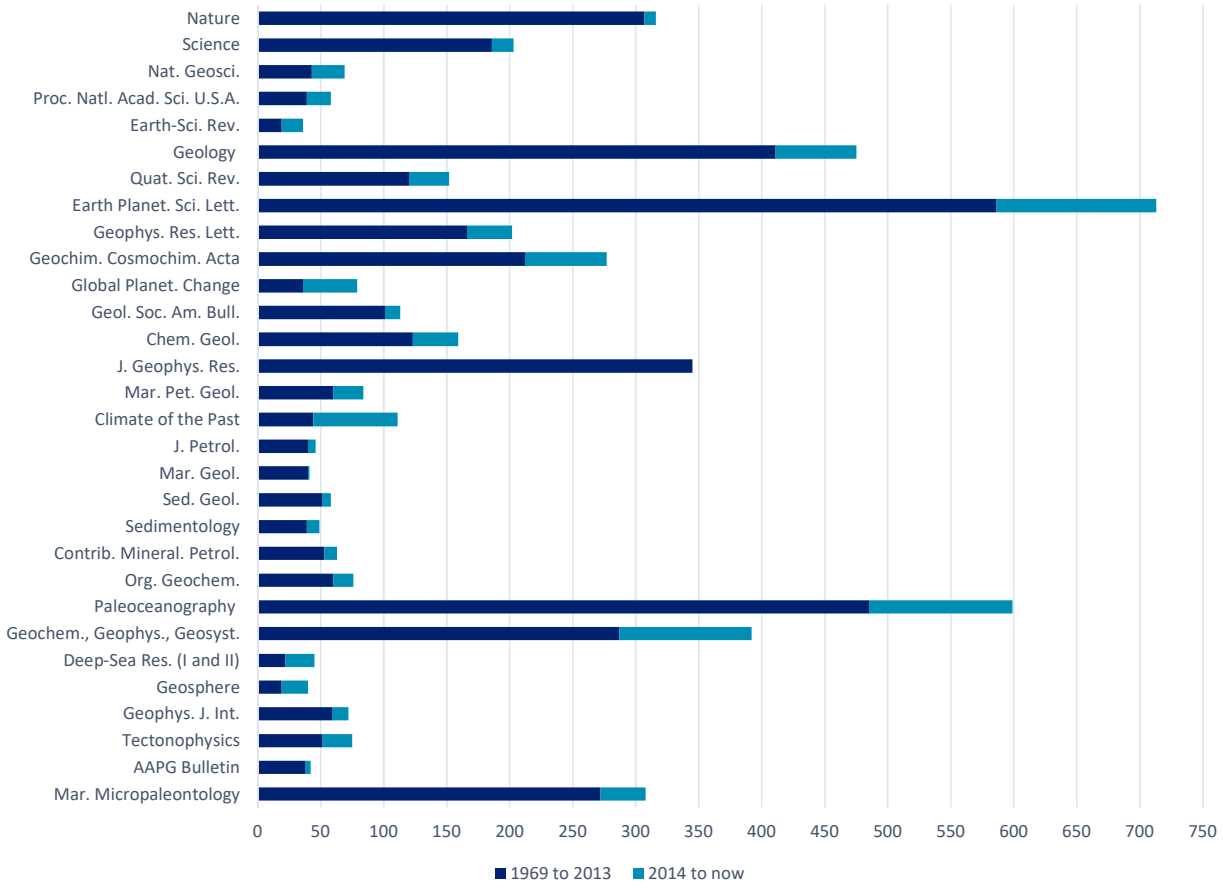


Table 1. Highly ranked peer-reviewed serials publishing Program-related expedition research results (1969–2019).

Journal	Journal Impact Factor (2018)	Number of Program-related papers published		
		1969–2013	2014–2019	Total
Nature	43.070	307	9	316
Science	41.037	186	17	203
Nature Geoscience	14.480	43	26	69
Proceedings of the National Academy of Sciences of the U.S.A.	9.580	39	19	58
Earth-Science Reviews	9.530	19	17	36
Geology	5.006	411	64	475
Quaternary Science Reviews	4.641	120	32	152
Earth and Planetary Science Letters	4.637	586	127	713
Geophysical Research Letters	4.578	166	36	202
Geochimica et Cosmochimica Acta	4.258	212	65	277
Global and Planetary Change	4.100	36	43	79
Geological Society of America Bulletin	3.970	101	12	113
Chemical Geology	3.618	123	36	159
Journal of Geophysical Research	3.585	345	0	345
Marine and Petroleum Geology	3.538	60	24	84
Climate of the Past	3.470	44	67	111
Journal of Petrology	3.380	40	6	46
Marine Geology	3.349	40	1	41
Sedimentary Geology	3.244	51	7	58
Sedimentology	3.244	39	10	49
Contributions to Mineralogy and Petrology	3.230	53	10	63
Organic Geochemistry	3.120	60	16	76
Paleoceanography	3.087	485	114	599
Geochemistry, Geophysics, Geosystems	2.946	287	105	392
Deep-Sea Research (Parts I and II)	2.848/2.430	22	23	45
Geosphere	2.847	19	21	40
Geophysical Journal International	2.777	59	13	72
Tectonophysics	2.764	51	24	75
AAPG Bulletin	2.677	38	4	42
Marine Micropaleontology	2.663	272	36	308

Publications by authors from current member countries

Of the 11,450 Program-related papers published in serial publications, 10,014 (87%) are first-authored by scientists from current IODP funding entities, which include the following.

- National Science Foundation (NSF), United States;
- Ministry of Education, Culture, Sports, Science and Technology (MEXT), Japan;
- European Consortium for Ocean Research Drilling (ECORD);
- Ministry of Science and Technology (MOST), People's Republic of China;
- Korea Institute of Geoscience and Mineral Resources (KIGAM);
- Australia-New Zealand IODP Consortium (ANZIC); and
- Ministry of Earth Sciences (MoES), India; and
- Coordination for Improvement of Higher Education Personnel (CAPES), Brazil.

Table 2 shows publication statistics for member countries and consortia, including the following.

- First author: the correspondence author of a paper.
- Contributing authors: co-authors listed on a paper.

- Serial contributions by country: the number papers that list contributing authors from each country. The country is counted once per paper regardless of the number of authors from that country.
- Serial contributions by author: the number of contributing authors from each country. Multiple contributors from a single country are each counted.
- Total contributions: the total number of times researchers from each country are included in the authorship of peer-reviewed serials, including first and contributing authors and multiple contributors from a single country per paper.

Table 2. Serial publication for peer-reviewed serials showing counts by first author, contributing country, contributing authors, and total contributions by all authors from current IODP member countries (1969–2019).

IODP member country or consortia	First authors of serials	Serial contributions by country	Serial contributions by author	Total contributions by all authors
Australia/New Zealand Consortium	**325**	**498**	**622**	**947**
Australia	186	334	397	583
New Zealand	139	164	225	364
Brazil	**26**	**36**	**38**	**64**
China	**447**	**356**	**475**	**922**
ECORD	**4,235**	**5,525**	**7,075**	**11,310**
Austria	15	43	44	59
Canada	329	421	502	831
Denmark	56	110	123	179
Finland	8	10	11	19
France	628	804	1,128	1,756
Germany	1,043	1,233	1,600	2,643
Ireland	5	24	26	31
Italy	288	364	478	766
Netherlands	233	276	300	533
Norway	141	192	223	364
Portugal	16	45	55	71
Spain	156	250	309	465
Sweden	105	143	149	254
Switzerland	142	217	234	376
United Kingdom	1,070	1,393	1,893	2,963
India	**176**	**101**	**120**	**296**
Japan	**724**	**868**	**1,923**	**2,647**
Republic of Korea	**56**	**91**	**104**	**160**
United States	**4,025**	**3,384**	**6,217**	**10,242**
Total papers:	**10,014**			**26,588**

Figure 4 shows serial publications with all authors from member countries for all Programs (1969–2019) with the number of contributions on a logarithmic scale.

Table 3 shows the breakdown of first authors by country or consortium affiliation for all non-Program publication types in the database. Note that theses and dissertations are underreported to AGI and are not fully represented.

Figure 4. Number of serial publications by authors from member countries (1969–2019).

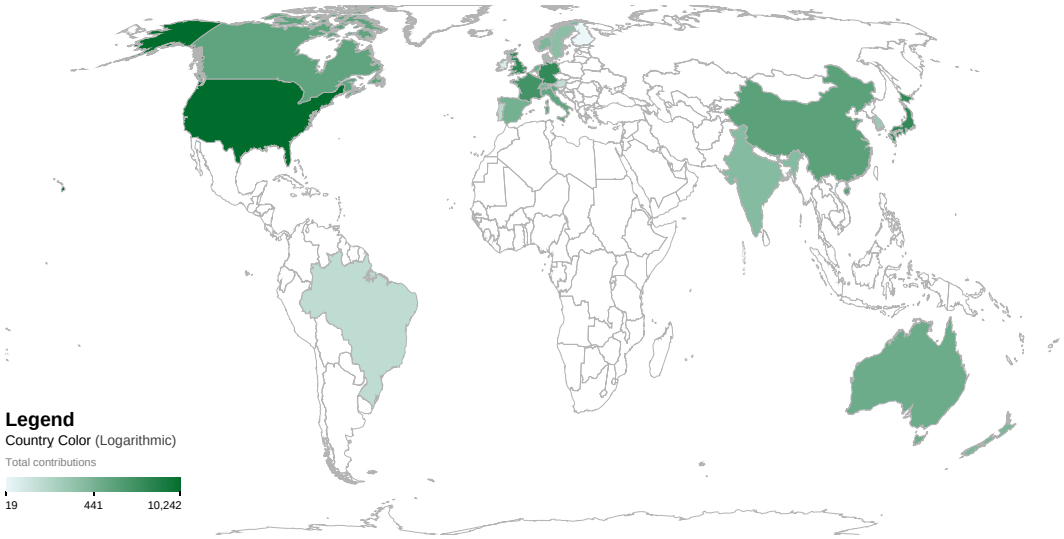


Table 3. First-authored non-Program publications by type and current funding consortium (1969–2019).

IODP member country or consortia	Serials	Misc.	Theses and dissertations		
			B.S.	M.S.	Ph.D.
Australia/New Zealand Consortium	325	466	4	6	4
Brazil	26	28	0	0	0
China	447	143	0	0	0
ECORD	4,235	4,874	14	19	110
India	176	58	0	3	3
Japan	724	815	0	0	0
Republic of Korea	56	69	0	0	0
United States	4,025	6,760	26	233	321
Totals:	**10,014**	**13,213**	**44**	**261**	**438**

Integrated Ocean Drilling Program and International Ocean Discovery Program (2003–2019)

Publication co-author networks

Figures 5 and 6 show co-author networks based on the serial records in the database. Each time authors publish a paper together, a line connects their countries; no line is shown if authors from the same country publish together. Each connecting line shows a minimum of 5 collaborations; line thickness indicates relative number of individual collaborations between authors from the two countries. Figure 5 includes all countries in the database that have a total of 10 or more author contributions. Figure 6 shows author contributions from current member countries.

In Figure 5, the numbers on the circles indicate the total number of times researchers from each country are listed in authorships and include first and contributing authors and multiple contributors from a single country per paper. For both Figures 5 and 6, the size of the circle indicates the relative number of authors. The color of the circle color indicates current member country funding entities: yellow = NSF, medium blue = ECORD, teal = Japan, light blue = China, pink = ANZIC, green = India, peach = KIGAM, gray = Brazil, orange = all other nonmember countries. Line colors are a mixture of the colors between collaborating countries.

Co-author networks were generated in Gephi (**https://gephi.org**) with the help of the Convert Excel and CSV files to Networks plug-in (**http://www.clementlevallois.net**).

Figure 5. Co-author networks for all authors of Program-related peer-reviewed journal articles (2003–2019).

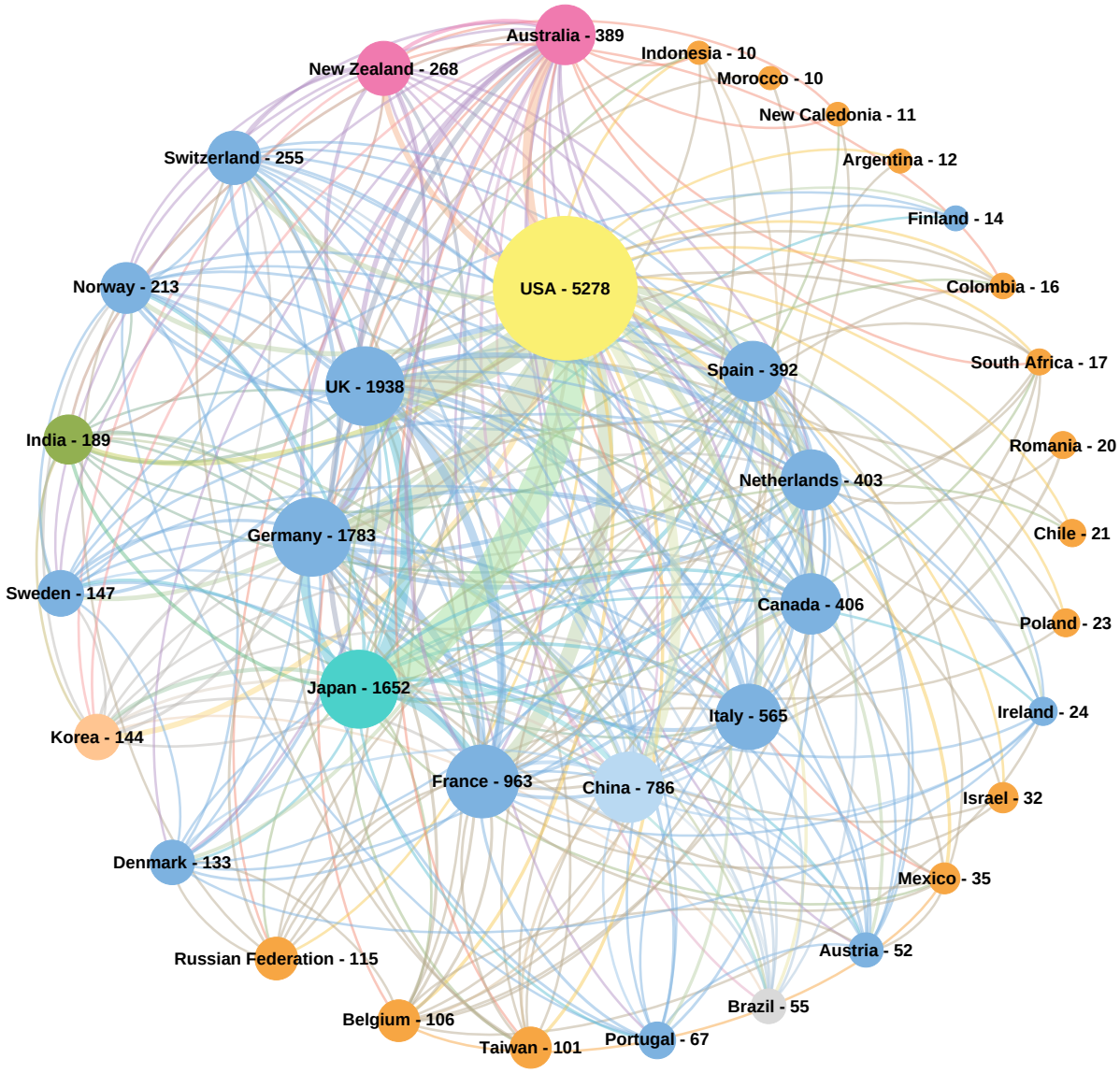
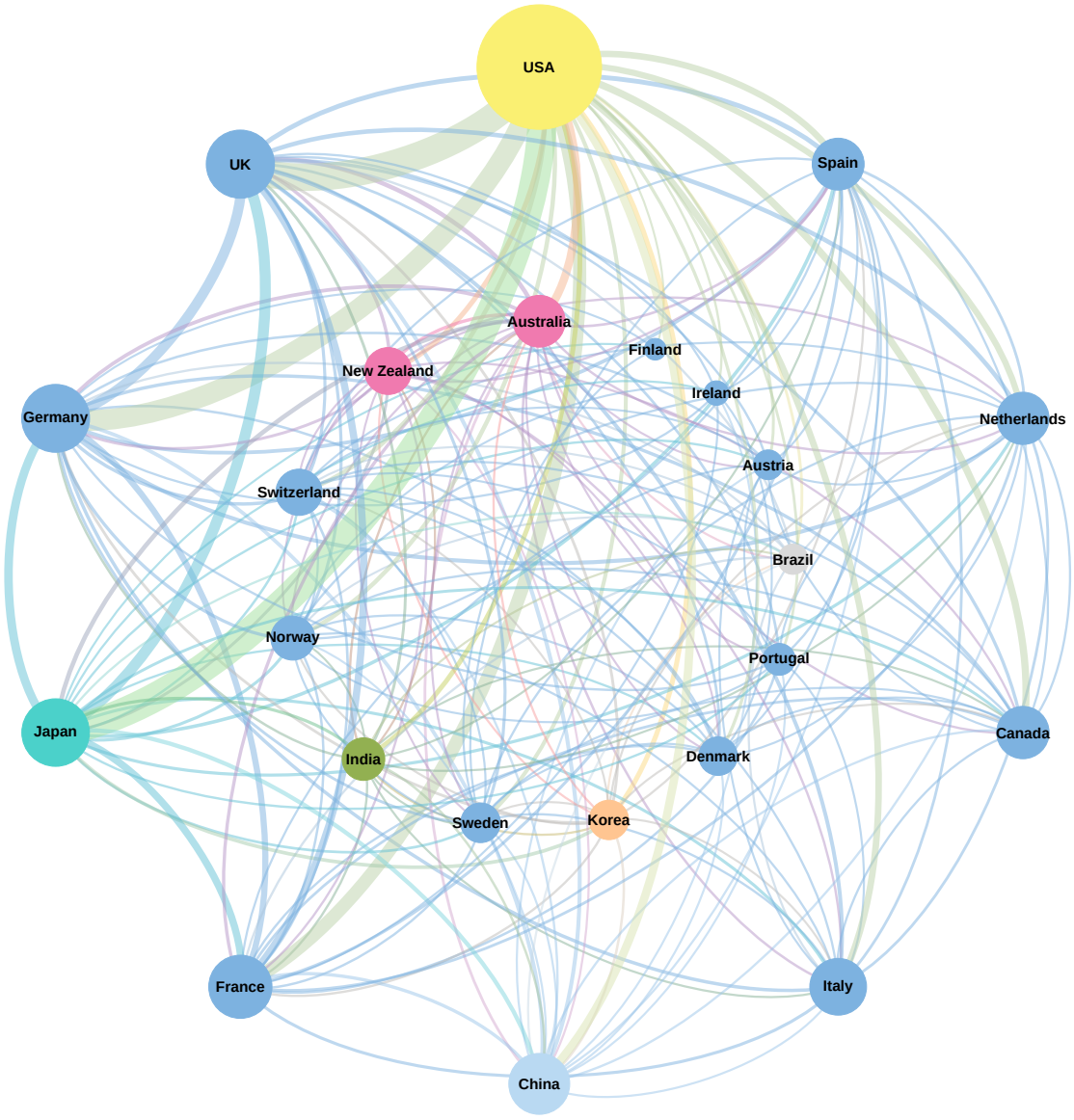


Figure 6. Co-author networks for authors of Program-related peer-reviewed journal articles from current member countries (2003–2019).



Publications by expedition

Figures 7 and 8 shows the number of Program and non-Program serial publication records for all completed Integrated Ocean Drilling Program and IODP expeditions whose Expedition Reports volumes published before the end of June 2019 (Expeditions 301–357, 359–372, 374–376, 380, and 381). Note that the publication tail for postcruise expedition research in both Program and serial publications extends for several years after the end of the expedition; hence, more recent expeditions have fewer publications credited to them, as illustrated in the figure.

Figure 7. Number of Program and serial publication records for Integrated Ocean Drilling Program Expeditions 301–348 (2003–2019).

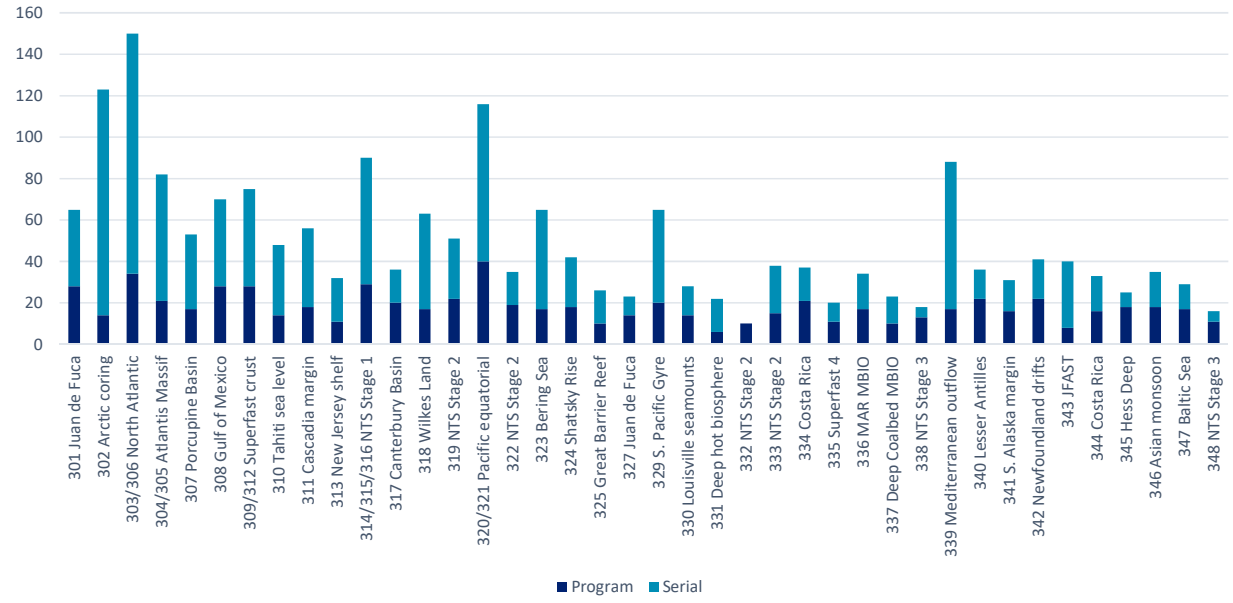
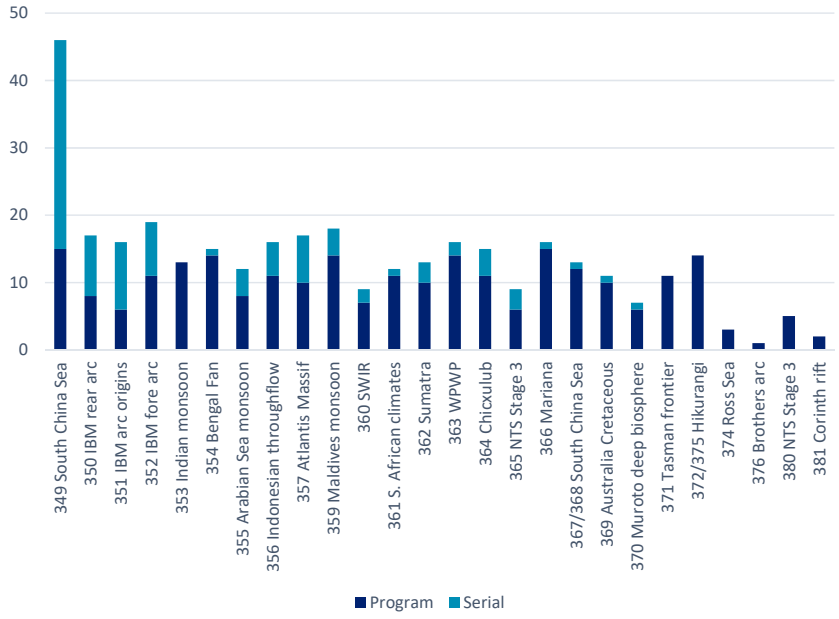


Figure 8. Number of Program and serial publication records for IODP Expeditions 349–357, 359–372, 374–376, 380, and 381 (2003–2019).



Publications by Science Plan theme

Figure 9 shows Program and non-Program (all types) records related to the Integrated Ocean Drilling Program (Expeditions 301–348) and sorted by *Integrated Ocean Drilling Program Initial Science Plan (2003–2013)* themes. Initial science plan themes are tied to the primary objectives of each expedition as listed in *Developments in Marine Geology 7: Earth and Life Processes Discovered from Subseafloor Environments (A Decade of Science Achieved by the Integrated Ocean Drilling Program [IODP])*.

- Deep Biosphere: Expeditions 301, 307, 308, 311, 327, 329–331, 334, 336, 337, and 344.
- Environmental Change, Processes and Effects: Expeditions 302, 303/306, 310, 313, 317, 318, 320/321, 323, 325, 339, 341, 342, 346, and 347.
- Solid Earth Cycles and Geodynamics: Expeditions 304/305, 309/312, 314/315/316, 319, 322, 324, 326, 332, 333, 335, 338, 340, 343, 345, and 348.

Figure 9. Integrated Ocean Drilling Program publication records (all types) by Initial Science Plan theme (2006–2019).

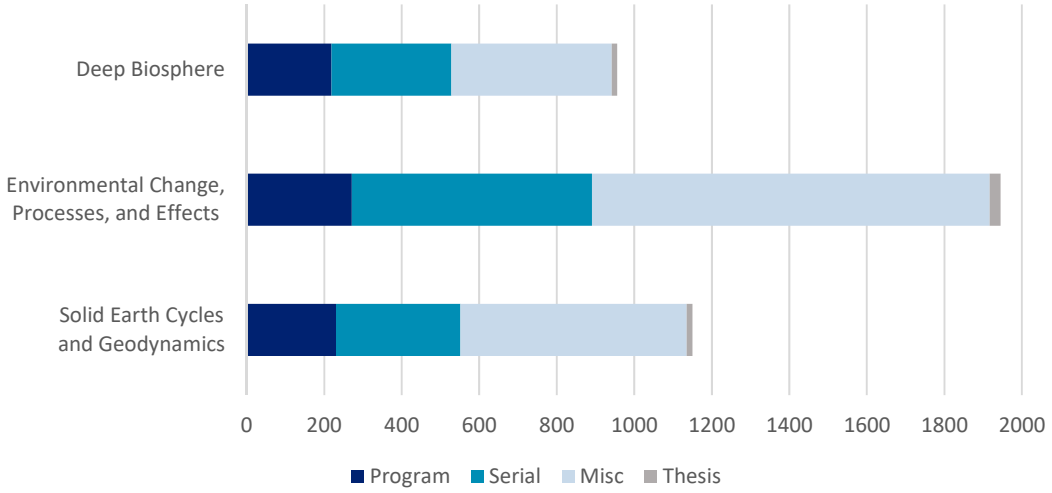


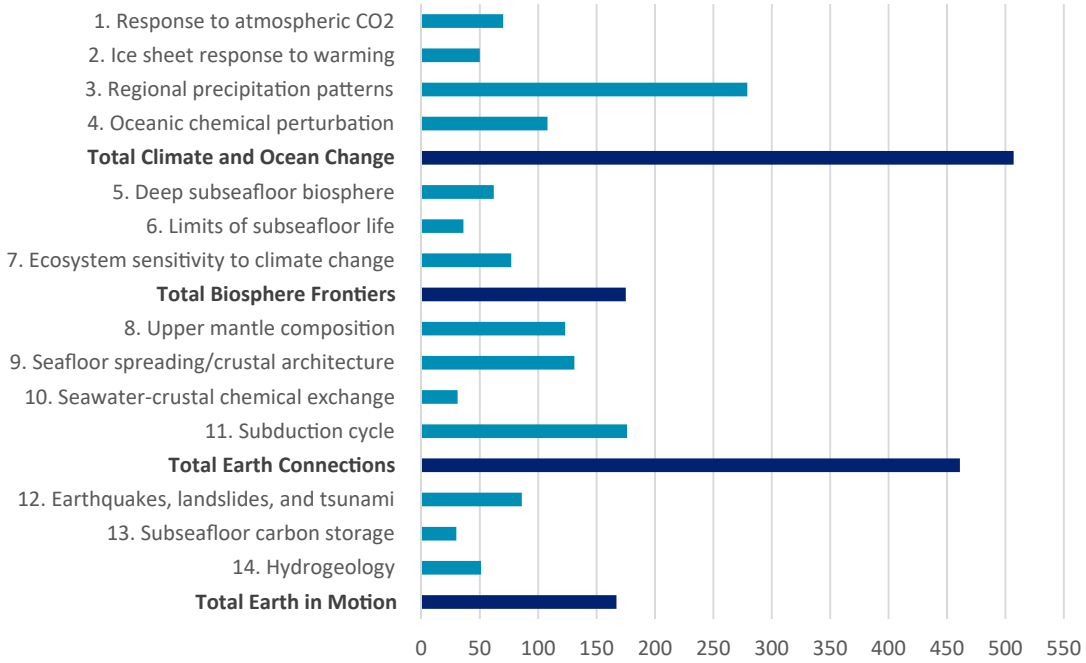
Figure 10 shows Program and non-Program serial, miscellaneous, and thesis/dissertation publication records related to IODP (Expeditions 349–386) and sorted by the themes and challenges of the IODP science plan (*Illuminating Earth's Past, Present, and Future: The Science Plan for the International Ocean Discovery Program 2013–2023*). Science plan themes are tied to the primary objectives of each expedition. IODP Science Plan contains four major themes and subsidiary challenges as listed below.

- Climate and Ocean Change: Reading the Past, Informing the Future
    1. How does Earth's climate system respond to elevated levels of atmospheric CO^2? (Expeditions 361, 369, 371, 373, 377, 378, and 382)
    2. How do ice sheets and sea level respond to a warming climate? (Expeditions 359, 373, 374, 377, 379, and 383)
    3. What controls regional patterns of precipitation, such as those associated with monsoons or El Nino? (Expeditions 353–356, 359, 361, and 363)
    4. How resilient is the ocean to chemical perturbations? (Expeditions 364, 369, 374, and 378)
- Biosphere Frontiers: Deep Life and Environmental Forcing of Evolution
    5. What are the origin, composition, and global significance of deep subseafloor communities? (Expeditions 357, 366, 374, 376, and 385)
    6. What are the limits of life in the subseafloor realm? (Expeditions 370, 374, and 376)

7. How sensitive are ecosystems and biodiversity to environmental change? (Expedition 364)

- Earth Connections: Deep Processes and Their Impact on Earth's Surface Environment
  8. What are the composition, structure, and dynamics of Earth's upper mantle? (Expeditions 356, 357, and 360)
  9. How are seafloor spreading and mantle melting linked to ocean crustal architecture? (Expeditions 349, 367/368, 369, 381, and 384)
  10. What are the mechanisms, magnitude, and history of chemical exchanges between the oceanic crust and seawater? (Expeditions 357 and 376)
  11. How do subduction zones initiate, cycle volatiles, and generate continental crust? (Expeditions 350–352 and 371)
- Earth in Motion: Processes and Hazards on Human Time Scales
  12. What mechanisms control the occurrence of destructive earthquakes, landslides, and tsunami? (Expeditions 362, 365, 372/375, 380, 381, and 386)
  13. What properties and processes govern the flow and storage of carbon in the subseafloor? (Expeditions 372 and 386)
  14. How do fluids link subseafloor tectonic, thermal, and biogeochemical processes? (Expeditions 357, 366, and 376)

Figure 10. International Ocean Discovery Program publication records (all types) by IODP Science Plan theme (2013–2019).



Alternative Impact Metrics

Citation statistics

As indexing and interconnectivity of scientific research results increase, we are better able to illustrate through citation data how often scientific publications are cited in other research articles. Citation data, in the form of number of times an article has been cited, can be accrued through several venues: Science

Direct, SCOPUS, CrossRef, Web of Science, Web of Knowledge, and others. Comprehensive citation data are unavailable at this time because not all publishers utilize citation data compilers. For this report, we collected citation data through Google Scholar in July 2019. Review of these data shows that Program publications and non-Program serial publications containing research results from Integrated Ocean Drilling Program and IODP expeditions have been cited in other research articles more than 43,300 times between 2003 and 2019. Expedition-related science continues to be cited in other research for many years after publication. Figures 11 and 12 include available citation counts for Expeditions 301–352.

Figure 11. Number of times Program or non-Program serial publications from Integrated Ocean Drilling Program expeditions were cited by other research articles (2003–2019).

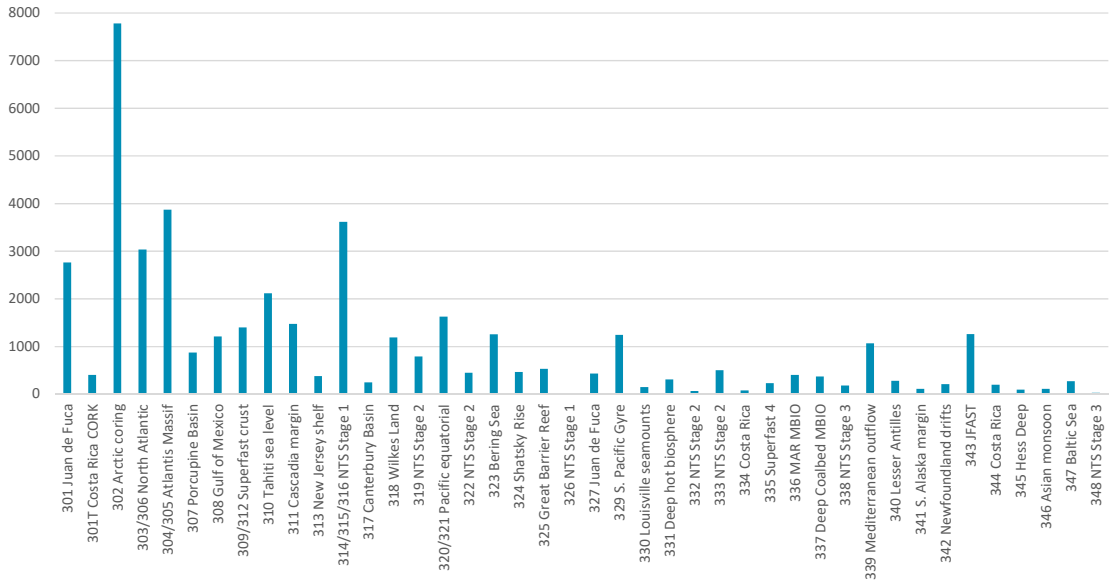


Figure 12. Number of times Program or non-Program serial publications from International Ocean Discovery Program expeditions were cited by other research articles (2003–2019).

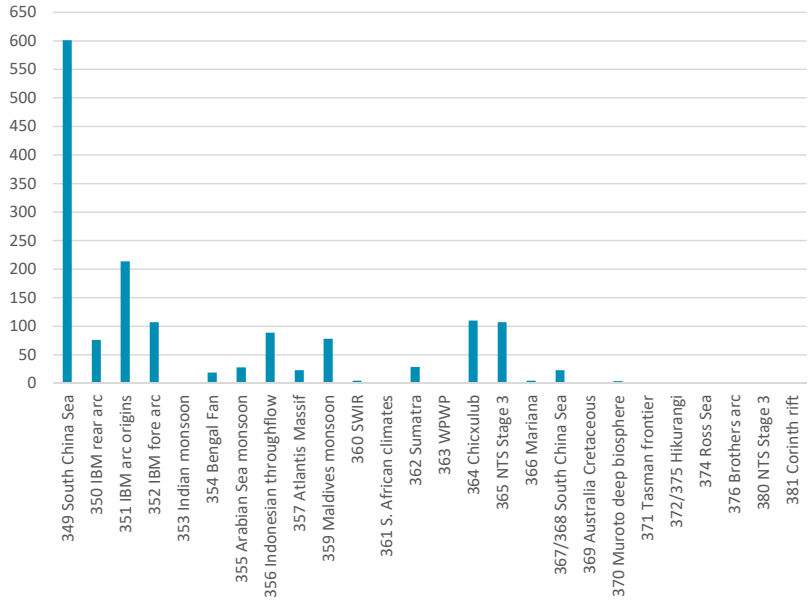
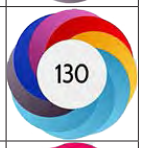


Table 4 lists the ODP, Integrated Ocean Drilling Program, and IODP expedition-related papers that have been most cited as of July 2019. It takes several years for papers to be published, and even more time for them to build up a high cited-by number; all of the most-cited papers are related to volumes published in 2011 or before. All of them are published in the top journals by impact factor, as shown in Figure 3. The Altmetric score for each paper is listed. See the next section for a discussion of Altmetric scores.

Table 4. Top cited Program-related serials as of July 2019 with corresponding Altmetric scores. Click on the graphic to view the live Altmetric data.

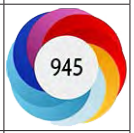
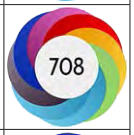
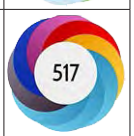
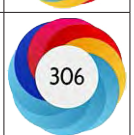
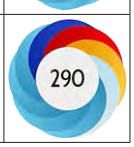
Article	Citations (*N*)	Altmetric score
Sluijs, A., Schouten, S., Pagani, M., Woltering, M., Brinkhuis, H., Sinninghe Damsté, J.S., Dickens, G.R., et al., 2006. Subtropical Arctic Ocean temperatures during the Palaeocene/ Eocene Thermal Maximum. *Nature,* 441(7093):610–613. **https://doi.org/10.1038/nature04668**	611	
Moran, K., Backman, J., Brinkhuis, H., Clemens, S.C., Cronin, T., Dickens, G.R., Eynaud, F., et al., 2006. The Cenozoic palaeoenvironment of the Arctic Ocean. *Nature,* 441(7093):601–605. **https://doi.org/10.1038/nature04800**	533	
Kallmeyer, J., Pockalny, R., Adhikari, R.R., Smith, D.C., and D'Hondt, S., 2012. Global distribution of microbial abundance and biomass in subseafloor sediment. *Proceedings of the National Academy of Sciences of the United States of America,* 109(40):16213–16216. **https://doi.org/10.1073/pnas.1203849109**	528	
Lipp, J.S., Morono, Y., Inagaki, F., and Hinrichs, K.-U., 2008. Significant contribution of Archaea to extant biomass in marine subsurface sediments. *Nature,* 454(7207):991–994. **https://doi.org/10.1038/nature07174**	526	
Grimes, C.B., John, B.E., Kelemen, P.B., Mazdab, F.K., Wooden, J.L., Cheadle, M.J., Hanghøj, K., and Schwartz, J.J., 2007. Trace element chemistry of zircons from oceanic crust: a method for distinguishing detrital zircon provenance. *Geology,* 35(7):643–646. **https://doi.org/10.1130/G23603A.1**	384	Not available
Pagani, M., Pedentchouk, N., Huber, M., Sluijs, A., Schouten, S., Brinkhuis, H., Sinninghe Damsté, J.S., Dickens, G.R., and Expedition 302 Scientists, 2006. Arctic hydrology during global warming at the Palaeocene/Eocene Thermal Maximum. *Nature,* 443(7103):671–675. **https://doi.org/10.1038/nature05043**	371	
Deschamps, P., Durand, N., Bard, E., Hamelin, B., Camoin, G., Thomas, A.L., Henderson, G.M., Okuno, J., and Yokoyama, Y., 2012. Ice-sheet collapse and sea-level rise at the Bølling warming 14,600 years ago. *Nature,* 483(7391):559–564. **https://doi.org/10.1038/nature10902**	363	Not available
Moore, G.F., Bangs, N.L., Taira, A., Kuramoto, S., Pangborn, E., and Tobin, H.J., 2007. Three-dimensional splay fault geometry and implications for tsunami generation. *Science,* 318(5853):1128–1131. **https://doi.org/10.1126/science.1147195**	340	
Frost, B.R., and Beard, J.S., 2007. On silica activity and serpentinization. *Journal of Petrology,* 48(7):1351–1368. **https://doi.org/10.1093/petrology/egm021**	302	Not available
Brinkhuis, H., Schouten, S., Collinson, M.E., Sluijs, A., Sinninghe Damsté, J.S., Dickens, G.R., Huber, M., et al., 2006. Episodic fresh surface waters in the Eocene Arctic Ocean. *Nature,* 441:606–609. **https://doi.org/10.1038/nature04692**	298	

Altmetric scores

Altmetric scores demonstrate the more immediate impact of papers by tracking mentions of them by news outlets, blogs, Wikipedia pages, and other social media. Table 5 lists the DSDP, ODP, Integrated Ocean Drilling Program, and IODP expedition-related serials with the highest Altmetric scores as of

August 2019. All of them are published in the top-ranked journals by impact factor, as shown in Figure 3. Altmetric score colors represent the following sources: red = news outlets, orange = blogs, light blue = Twitter, dark blue = Facebook, gray = Wikipedia, purple = policy source, plum = Google+, light blue = Reddit, light green = video uploader, and pink = research highlight platform. Visit the Altmetric website for more information about Altmetric scores (**https://www.altmetric.com**).

Table 5. Expedition-related papers with the highest Altmetric scores as of 5 August 2019. Click on the graphic to view the live Altmetric data and links to news articles and social media stories about each article.

Article	Expedition	Altmetric score
Morgan, J.V., Gulick, S.P.S., Bralower, T., Chenot, E., Christeson, G., Claeys, P., Cockell, C., et al., 2016. The formation of peak rings in large impact craters. *Science,* 354(6314):878–882. **https://doi.org/10.1126/science.aah6561**	IODP 364	
Sager, W.W., Zhang, J., Korenaga, J., Sano, T., Koppers, A.A.P., Widdowson, M., and Mahoney, J.J., 2013. An immense shield volcano within the Shatsky Rise oceanic plateau, northwest Pacific Ocean. *Nature Geoscience,* 6:976–981. **https://doi.org/10.1038/ngeo1934**	IODP 324 with ODP 192 and 198	
Webster, J.M., Braga, J.C., Humblet, M., Potts, D.C., Iryu, Y., Yokoyama, Y., Fujita, K., et al., 2018. Response of the Great Barrier Reef to sea-level and environmental changes over the past 30,000 years. *Nature Geoscience,* 11:426–432. **https://doi.org/10.1038/s41561-018-0127-3**	IODP 325	
Artemieva, N., Morgan, J., and the Expedition 364 Science Party, 2017. Quantifying the release of climate-active gases by large meteorite impacts with a case study of Chicxulub: release of climate-active gases. *Geophysical Research Letters,* 44(20):10180–10188. **https://doi.org/10.1002/2017GL074879**	IODP 364	
Gutjahr, M., Ridgwell, A., Sexton, P.F., Anagnostou, E., Pearson, P.N., Pälike, H., Norris, R.D., Thomas, E., and Foster, G.L., 2017. Very large release of mostly volcanic carbon during the Paleocene-Eocene Thermal Maximum. *Nature,* 548:573–577. **https://doi.org/10.1038/nature23646**	DSDP 48	
Gustafson, C., Key, K., and Evans, R.L., 2019. Aquifer systems extending far offshore on the U.S. Atlantic margin. *Scientific Reports,* 9:8709. **https://doi.org/10.1038/s41598-019-44611-7**	IODP 313	
Lowery, C.M., Bralower, T.J., Owens, J.D., Rodríguez-Tovar, F.J., Jones, H., Smit, J., et al., 2018. Rapid recovery of life at ground zero of the end-Cretaceous mass extinction. *Nature,* 588:288–291. **https://doi.org/10.1038/s41586-018-0163-6**	IODP 364	
Fulton, P.M., Brodsky, E.E., Kano, Y., Mori, J., Chester, F., Ishikawa, T., Harris, R.N., et al., 2013. Low coseismic friction on the Tohoku-oki fault determined from temperature measurements. *Science,* 342(6163)1214–1217. **https://doi.org/10.1126/science.1243641**	IODP 343	
Chester, F.M., Rowe, C., Ujiie, K., Kirkpatrick, J., Regalla, C., Remitti, F., Moore, J.C., et al., 2013. Structure and composition of the plate-boundary slip zone for the 2011 Tohoku-oki Earthquake. *Science,* 342(6163):1208–1211. **https://doi.org/10.1126/science.1243719**	IODP 343	
Ménez, B., Pisapia, C., Andreani, M., Jamme, F., Vanbellingen, Q.P., Brunelle, A., Richard, L., Dumas, P., and Réfrégiers, M., 2018. Abiotic synthesis of amino acids in the recesses of the oceanic lithosphere. *Nature,* 564:59–63. **https://doi.org/10.1038/s41586-018-0684-z**	IODP 304	
Wilson, D.J., Bertram, R.A., Needham, E.F., van de Flierdt, T., Welsh, K.J., McKay, R.M., Mazumder, A., et al., 2018. Ice loss from the East Antarctic Ice Sheet during late Pleistocene interglacials. *Nature,* 561:383–386. **https://doi.org/10.1038/s41586-018-0501-8**	IODP 318	

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