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Hawaii bibliographic database

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Abstract The Hawaii bibliographic database has been created to contain all of the literature, from 1779 to the present, pertinent to the volcanological history of the Hawaiian-Emperor volcanic chain. References are entered in a PC- and Macintosh-compatible EndNote Plus bibliographic database with keywords and abstracts or (if no abstract) with annotations as to content. Keywords emphasize location, discipline, process, identification of new chemical data or age determinations, and type of publication. The database is updated approximately three times a year and is available to upload from an ftp site. The bibliography contained 8460 references at the time this paper was submitted for publication. Use of the database greatly enhances the power and completeness of library searches for anyone interested in Hawaiian volcanism.

Key words Bibliography · Computer · Hawaiian-Emperor chain · Volcanology · Eruption · Earthquake · Landslide

Introduction

The volcanic islands, atolls, and seamounts that make up the Hawaiian-Emperor volcanic chain are the subjects of a comprehensive bibliographic database of more than 8400 references. The computer database is maintained at the U.S. Geological Survey's Hawaiian Volcano Observatory (HVO). The database consists of

publications extending from the earliest volcano observations made during the discovery of the Island of Hawaii by Captain James Cook in 1779 to abstracts covering the May 1997 meetings of the American Geophysical Union and the Cordilleran section, Geological Society of America. The database includes journal articles, meeting abstracts, selected books, book chapters, and "gray" literature, and, for the Island of Hawaii, magazine and newspaper articles covering active volcanism in the nineteenth and early twentieth centuries. References cover all disciplines relevant to understanding the birth, growth, and decline of the Hawaiian volcanic islands, e.g., seismology, geodesy, nonseismic geophysics, geology, geochemistry, petrology, hydrology, soil science, geomorphology, geobotany, instrumental monitoring, and remote sensing (Fig. 1). Through the use of keywords, we have emphasized volcanic processes, such as the dynamics of magma storage, transport, and fractionation, lava flow and dike emplacement, revegetation of new lava, hot spot and thermal plume mechanics, geochemistry and geophysics of melting in the oceanic mantle, lava-water interaction, and geothermal and hydrothermal processes in basaltic magma systems. We also cover processes by which the volcanoes are converted from high-standing mountains to seamounts, including erosion, subsidence, and mass-wasting through landslides.

Background: the publication explosion

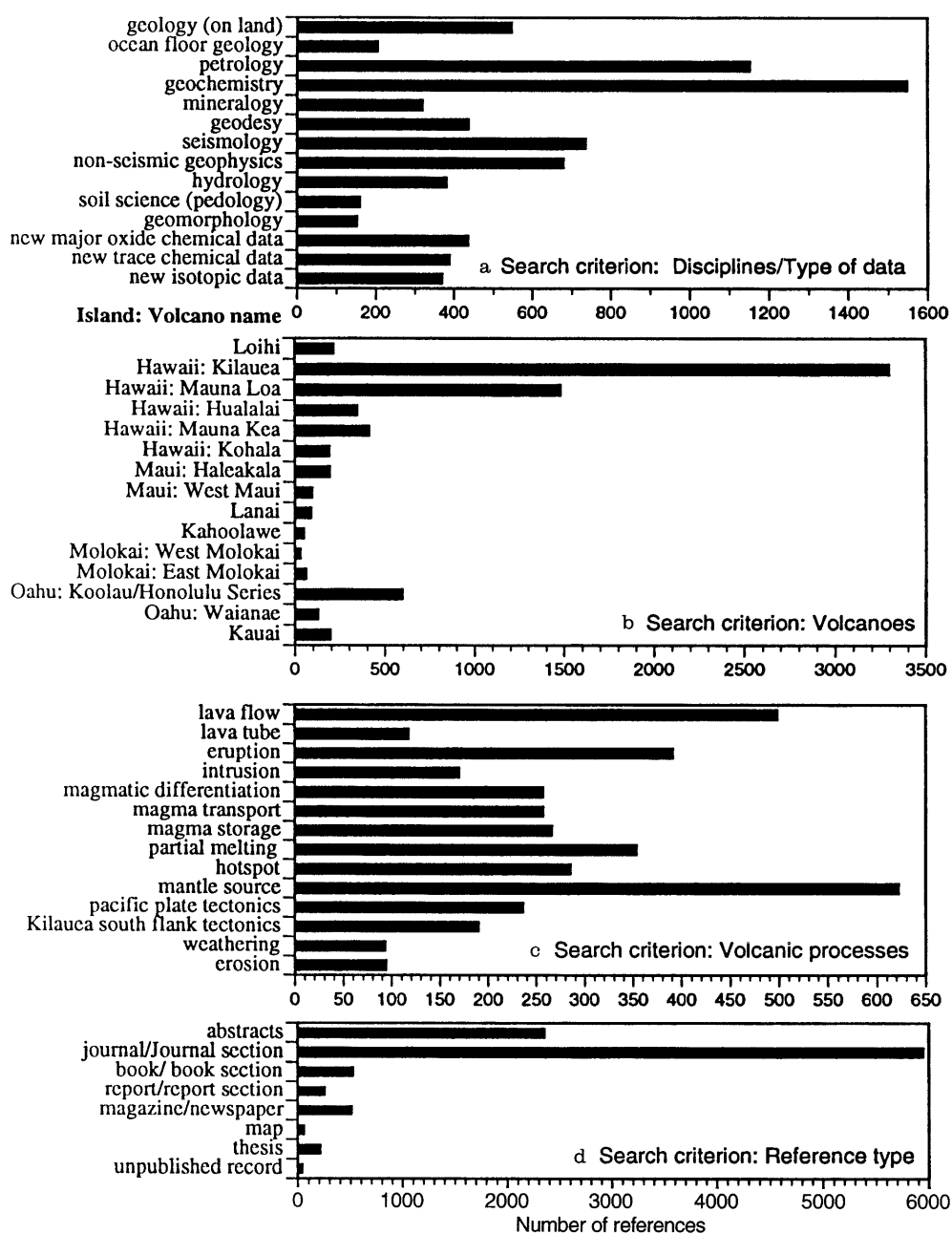
The vast body of scientific literature available presently, on even narrowly focused topics, presents a challenge to anyone attempting to understand natural phenomena. Anyone publishing presently will find it difficult, using only library facilities, to discover all the relevant literature. Figure 2 shows the growth of literature about the Hawaiian Islands through the end of 1995. Data are a moving 5-year average of the number of publications per year arbitrarily plotted at the middle (third) year. A constant rate of publication for any pe-

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Fig. 1a–d Representative content of the database through 1995. Each *bar* shows the number of references on a given topic. **a** Disciplines covered and selected types of new chemical data. **b** Islands covered. The active volcanoes, Kilauea and Mauna Loa, dominate the literature. **c** Selected volcanologic processes. **d** Types of references. Abstracts include all meeting abstracts, designated by “[abs.]” in title field. Journal/Journal section excludes meeting abstracts



riod will appear on the plots as a horizontal line. A positive slope signifies an increase in the publication rate. Figure 2a shows all publications, beginning before 1800; Fig. 2b shows publications other than meeting abstracts (principally journal articles) from 1954 to 1995. Also plotted in Fig. 2b are 15 years of citations in the earth sciences published in “Current Contents” and a record of the times Kilauea Volcano was in eruption.

From 1819 to approximately 1950, the overall publication rate was low and increased only 0.09 publications per year, or less than one publication per year every decade. High points during this period follow the well-observed and studied Mauna Loa eruption of 1880–1881, the founding of HVO in 1912, and the publication of “The Volcano Letter” beginning in 1925.

During the Depression (1929–1935) and World War II (1940–1945), the publication rate decreased to meet the long-term trend. The publication rate accelerated beginning in the 1950s, following the expansion of instrumental monitoring at HVO and the beginnings of “modern” volcanological studies, particularly in geochemistry and petrology. A fairly constant rate of increase in publications per year took place between the early 1960s, spurred by interest in the spectacular 1959 and 1960 eruptions of Kilauea, and the mid-1980s, covering the period of the long Mauna Ulu eruption (May 1969 to July 1974), a M7.2 earthquake on Kilauea’s south flank (November 1975), and a 1979 symposium on Hawaiian volcanism held in Hawaii. Further increases occurred during the early 1990s, again asso-

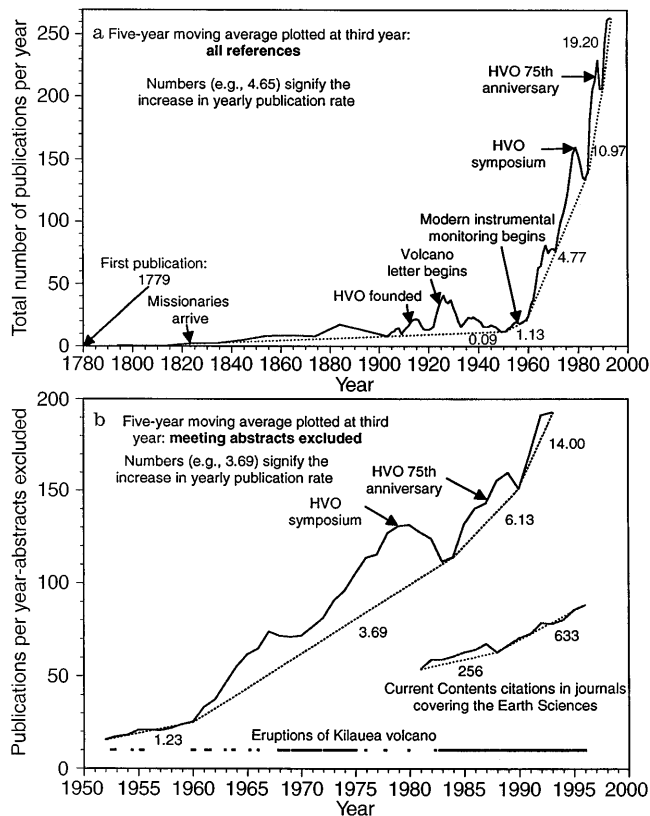


Fig. 2a, b Publication history, Hawaiian-Emperor Chain, 1779–1995. **a** All references, 1779–1995. **b** Abstracts omitted, 1950–1995. Periods in which Kilauea was in eruption are plotted at the base. The graph to the lower right shows an overall earth science publication trend represented by number of citations per year in earth science journals indexed in Current Contents. (Data from The Institute for Scientific Information's National Science Indicators on Diskette, 1981–1996, kindly provided to the authors by D. Pendlebury.)

ciated with the advent of continuous eruption at Kilauea in 1983 and an international symposium in Hawaii, convened in January 1987 on the 75th anniversary of the founding of HVO. The rate of publication is still accelerating, up to the last year (1995) for which the entries are substantially complete at this writing, beyond rates of 19.2 (all publications) and 14.0 (abstracts excluded) additional publications per year.

The more recent Hawaii data show trends similar to those that characterize the earth sciences as a whole, i.e., an acceleration of publication rates over the past decade. However, the Hawaii data show much steeper increases than the rest of the field, most likely due to the unique scientific interest generated by two long-lived eruptions of Kilauea, one of which continues as this paper goes to press.

Utility of the database

The Hawaii bibliographic database makes manageable the ever-increasing literature on the Hawaiian Islands.

Researchers, lay persons, and students previously unfamiliar with Hawaiian volcanism may greatly reduce the amount of time needed to find papers relevant to their field of interest. Persons already familiar with the field benefit from the compilation of historical and current material in one database. Of particular value is the capability to sort references obtained in a subject search (e.g., hot spot) by date, thus obtaining a history of the development of an idea. Much of our current understanding of Kilauea has been anticipated by early workers, but few of their insights are either cited or discussed. These workers could rarely prove their ideas due to the limitations imposed by the data available to them, so their insights into volcanic process are all the more noteworthy. The new ideas and insights of current researchers may likewise be subject to reinterpretation or further quantification as techniques evolve and new paradigms of understanding become available.

Methodology

The Hawaii bibliographic database has been constructed using the Macintosh version of the EndNote Plus bibliographic database program¹. For PC users, the database is readable by the Windows version of the same program. All abstracts, including meeting abstracts, have been optically scanned and entered in the database. References (mostly earlier than 1955) that lack an abstract are annotated. Keywords have been reviewed for completeness and consistency, and a lexicon has been created listing all of the terms used under the four categories Space/Time, Discipline, Event/Process, and Data/Type of publication. Using the lexicon, searches can be made by judicious choice of keywords alone, although it is also possible to broaden searches to include the abstract and title fields. Results of keyword searches made on some of the broader terms in each category are shown in Fig. 1.

Space/Time terms include general terms for the Hawaiian-Emperor Chain (**hec**), Hawaiian Islands (**ha**), and names of islands, volcanoes, seamounts, stratigraphically defined formations, and tectonic features such as fracture zones.

Discipline terms cover most earth science disciplines, as well as ancillary fields, such as biology, botany, limnology, remote sensing, and education (pedagogy) as they relate to Hawaiian volcanoes. Discipline-related keywords have been further coded to emphasize concepts of topical interest, e.g., **seismology.tomography** covers investigations using seismic tomography, and **n(on)s(eismic)g(eophysics).gravity** covers studies where gravity measurements are important. We pay special attention in the keyword field to subject matter

¹ Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government

in the body of a paper that is not mentioned in the title or abstract, as a means of identifying papers that would be otherwise easily missed in a subject search. No attempt is made to further subdivide those disciplines outside our field of expertise, such as hydrology. The hydrologist might search for “hydrology” in the keyword field and other terms in the abstract or title fields (e.g., “groundwater”) to obtain the relevant references.

Event/Process terms cover specific events and processes of volcanologic interest. Eruptions and large earthquakes have specific keywords identifying their location and date of occurrence. For example, the keyword **eq.1975.ksf** identifies the earthquake that occurred on Kilauea’s south flank on 29 November 1975 and **kl.erz.1983** refers to the eruption on Kilauea’s east rift zone that began 3 January 1983. The term **mech** is used to refer to a process. For example, **mech.earthquake** identifies determination or discussion of earthquake focal mechanism and **mech.java flow** identifies papers that address the mechanics of flowing lava. The Data/Type of publication category identifies newly published geochemical or age data and special publication categories such as bibliographies and obituaries. The keyword **data.new** is used to identify newly published chemical data (major oxides, trace elements, and isotopes) or age determinations for rocks, minerals, water, and soil. As a highly specific example, **data.new.mineral.ol.cpx.trace.cr.ni** identifies new determinations of chrome and nickel in olivine and clinopyroxene, and **data.new.age.k-ar** identifies new potassium–argon age(s).

The database is indexed by all the words in the author, title, journal, abstract, and keyword fields, enabling search times of only a few seconds. In addition to references on the Hawaiian-Emperor volcanic chain, which constitute the core of the database, we have included additional material that lacks explicit reference to Hawaii, but which addresses general processes, such as the origin of volcanic tremor or the dynamics of thermal plumes, that would benefit a student of Hawaiian volcanism. Because Hawaii has been the source of so much literature on volcanic processes, the database provides a useful entry point for broader studies of volcanism around the world. Finally, this database provides a model from which to construct other specialized databases covering different geographic areas and subject matter.

Bibliographic style

We have created a bibliographic style following as closely as possible the guidelines in “Suggestions to Authors of the Reports of the United States Geological Survey” (Hansen 1991). We recognize the following reference types: Book, Edited Book, Book Section, Journal, Journal Section, Report, Report Section, Magazine, Newspaper, Unpublished Record, Map (Journal), Map (Book), Conference Proceedings (Journal),

and Conference Proceedings (Book). All meeting abstracts are designated by “[abs.]” in the title field. Abstracts from the two major earth science conferences in the United States, the American Geophysical Union spring and fall meetings, and the Geological Society of America annual and regional meetings, are catalogued under Journal rather than as Conference Proceedings because the abstracts are published in a Journal series (i.e., supplements to “Eos” and annual collections of GSA abstracts). Conference information for these meetings is given in the Notes section of each bibliographic entry. Our style differs from the GEOREF entries for the same abstracts, where they are classified as conference documents.

Comparison with GEOREF

The GEOREF computer database has become an invaluable aid to research in the earth sciences, particularly as a starting point for general subjects or for specific regions of the world (GEOREF, 1973-). We have been asked on many occasions whether our database duplicates what is already available on GEOREF. As presently constituted, the database complements GEOREF, the keywords of which most commonly relate to geographic region, discipline, rock names, and other general terms in the GEOREF lexicon. Our keyword structure is specifically aimed at data and processes relevant to Hawaiian volcanism and includes many terms not in the GEOREF lexicon. Searches in our database may be made for more specific subjects, particularly those related to volcanic process, than may be made in GEOREF. Our database has the additional flexibility of searching by using words that might be expected in an abstract, irrespective of how we may have subjectively assigned keywords to a paper.

Until the 1990s the overlap between our database and GEOREF was somewhat greater than 50% of the published references, i.e., of 1000 references in our database covering a specific time interval, approximately 300 were not in GEOREF and, likewise, in a GEOREF search for “Hawaii*” in either the title or descriptor (keyword) field, approximately 300 references obtained from a total of 1000 were missing from our database, giving an overlap of 700 references from a possible 1300. We have since added all of the relevant references from our GEOREF searches. Currently, we search the GEOREF bimonthly updates to identify references not found in our own weekly searches of literature arriving at the U.S. Geological Survey library in Reston, Virginia, or at the library at HVO. In 1995 the American Geological Institute (AGI) began to add abstracts already in our database to Hawaiian references already in GEOREF. They will soon add references from the Hawaii bibliographic database that are not currently in GEOREF. (The preceding information was provided by S. Tarakeli of the American Geological Institute in September 1997.)

Access to the Hawaiian bibliographic database

The database is housed at the following site from which it may be accessed via anonymous ftp: **mojave.wr.usgs.gov/pub/twright**

Separate subdirectories are maintained for Macintosh and Windows users. These contain the two parts of the bibliographic database, compressed for more rapid ftp transfer, a demo version of the EndNote Plus program, a keyword lexicon, an information file on using the database, and a "readme" file. The readme file in each subdirectory should be uploaded first, as it contains instructions for the rest of the upload. Note to DOS users: the indexed files are incompatible with DOS word length conventions. An unindexed database can be obtained from the senior author if needed.

The database is updated approximately every 4 months, and the date of update is given as part of the subdirectory or bibliographic file name (e.g., 1.13.97 refers to an update on January 13, 1997). Users of the database are requested to help us by identifying references that we may have overlooked, errors in the bibliographic entries, or additional keywords. Communication to the authors may be made by depositing a corrected EndNote file in the subdirectory in twright labeled "Incoming," backed up by an e-mail message to us (twright@usgs.gov; jtakahashi@usgs.gov) telling us about what you have deposited. All corrections and additions will be incorporated in the following update.

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