

BIBLIOGRAPHY OF SUBSIDENCE AND EARTH FISSURES WITHIN ARIZONA

by

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BIBLIOGRAPHY OF SUBSIDENCE AND EARTH FISSURES WITHIN ARIZONA

Land subsidence and related earth fissures have become widespread occurrences in southern Arizona. As the areal and vertical extent of subsidence has increased, more earth fissures have been discovered. As a result, there is growing concern about existing and potential damage caused by these phenomena. This concern is reflected by the increasing number of requests for information received by the Arizona Geological Survey (AZGS), which has prompted the compilation of this bibliography, establishment of a Steering Committee on Subsidence and Earth Fissures, and formation of the Center for Land-Subsidence and Earth-Fissure Information (CLASEFI), which is supported jointly by the AZGS and the Arizona Department of Water Resources.

Although many human-induced and natural processes give rise to land subsidence and earth fissures, those in southern Arizona are closely linked to long-term extraction of ground water by man. This bibliography, therefore, focuses on subsidence resulting from ground-water withdrawal. As ground water is removed from some alluvial aquifers, sediment particles in those aquifers lose some of their ability to support the overburden, the grains become more closely packed, and aquifer volume decreases. The land surface sinks (subsides) in response to the decreased aquifer volume at depth. This type of subsidence proceeds gradually, but, with time, can spread over large areas and cause significant deformation.

Earth fissures are one of the most dramatic manifestations of land subsidence. They are surficial tensile breaks in unconsolidated or semi-consolidated sedimentary units that first appear as narrow cracks or lines of small, shallow depressions, and then commonly grow larger by water erosion. They are most likely caused by differential subsidence, that is, subsidence that is not uniform throughout an area because of differences in subsurface geology, ground-water conditions, or pumping rates. When land subsides more or at a different rate than adjacent land, fissures may develop.

In 1990, the AZGS published the Bibliography on Arizona Earth Fissures and Related Subsidence, with Selected References for other Areas (Arizona Geological Survey Open-File Report 90-7, by S. Slaff). The current publication, Open-File Report 95-8, is an update of the references within Arizona. This version includes references to selected publications which, though not specifically about subsidence and earth-fissure studies, are germane to investigations of these subjects. The current publication supersedes the preliminary update of the bibliography, Open-File Report 94-16, published in 1994. References for areas outside of Arizona have not been included in this document; for those references, please see AZGS Open-File Report 90-7.

In our effort to maintain a current and comprehensive database on subsidence and earth fissures, we would appreciate being informed of additional references, including unpublished reports, on these subjects. Please send complete citations to: Arizona Geological Survey, 416 W. Congress St., Suite 100, Tucson, AZ 85701, Attention: CLASEFI.

The AZGS consults with the Steering Committee on Subsidence and Earth Fissures, comprised of representatives from thirteen county, state, and federal agencies which have direct involvement with earth fissures and land subsidence. The goal of the Committee is to coordinate efforts and define priorities for subsidence and earth fissure-related activities in Arizona. In that capacity, the Committee defined the following mission for CLASEFI:

The mission of the Center for Land-Subsidence and Earth-Fissure Information is to monitor, map, investigate, and compile information about land subsidence and earth fissures in Arizona and provide this information to governmental agencies and the public for use in making prudent land- and water-resource-management policies and decisions

With the guidance of the Steering Committee, the following preliminary goals were identified for CLASEFI: 1) assemble all existing data on subsidence and earth fissures in Arizona; 2) compile results of prevention, prediction and mitigation studies of these problems; 3) collect hydrologic and subsidence data and field-check reported fissure areas; and 4) implement an educational campaign to promote awareness and assist in prevention and mitigation practices in Arizona.

If you would like further information on the Committee or CLASEFI, please contact the Arizona Geological Survey.

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