Introduction

One of the aftermaths of Iraq's invasion of Kuwait was the ignition of 610 oil wells, storage tanks, and refineries. These fires initially consumed over 6 million barrels of oil per day. In May 1991, several months after their ignition, the fires were still emitting soot into the atmosphere at a rate equivalent to that from 3 million heavy-duty diesel trucks, particles (<3.5-μm diameter) at a rate of 10% of worldwide anthropogenic emissions, and SO_2 at about 5% of global anthropogenic emissions. These emissions had significant effects on air quality and on the weather in portions of the Persian Gulf region; it was speculated that they might also affect the atmosphere on a global scale.

In response to requests from the United Nations and the World Meteorological Organization for investigations of this gross example of air pollution and its effects on the atmosphere, the National Science Foundation (NSF) coordinated an interagency-funded airborne study of the smoke from the Kuwait oil fires. As part of this study, a team of scientists from universities, the National Center for Atmospheric Research (NCAR), and government laboratories obtained airborne measurements, aboard the University of Washington's Convair C-131 and NSF/NCAR's Lockheed Electra aircraft, in the Persian Gulf area during the period May 16 through June 12, 1991.

This special section of the *Journal of Geophysical Research* contains a selection of preliminary reports on this unique study. Topics covered range from the chemical composition of the smoke, rates of emissions of particles and gases, nature of the smoke particles, optical and radiative properties of the smoke, and satellite observations.

Complete analyses of the very large data set that was collected in this project will take several years and will be reported in a further series of papers. The data are being archived at NCAR and are available on request. These data should be invaluable for a variety of pure and applied research.

The U.S. interagency airborne study of the Kuwait oil fires would not have been possible without the dedicated efforts of many individuals. In particular, I wish to acknowledge Richard Greenfield of NSF for his enthusiasm and interest in all aspects of this study and for coordinating the funding of this project by NSF, the Defense Nuclear Agency, the Department of Energy, and the National Oceanic and Atmospheric Administration. The University Corporation for Atmospheric Research, under president Richard Anthes, helped coordinate funding from the National Geographic Society. Thanks are due to all of the scientists, engineers, and pilots who participated in this difficult airborne research program. J. Opacki (University of Washington) and J. Graham, V. Holzhauer, and L. Banks (NCAR) played crucial administrative roles before, during, and after the field project. In Bahrain, Majeed Isa, chief of meteorology, kindly provided us with office space, and Khalid Fakhro, vice-chief EPC, Bahrain, helped in local arrangements and coordination. Finally, I wish to thank my coprincipal investigator in this study, Lawrence F. Radke, who headed the NSF/NCAR Electra effort.

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