Homepage for the Global Tropospheric Experiment

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Abstract

The objective of my NASA summer research project was to create a homepage to describe and present results from the NASA Global Tropospheric Experiment (GTE). The GTE is a major component of NASA's Tropospheric Chemistry Program and is managed in the Atmospheric Studies Branch, Atmospheric Sciences Division at the NASA Langley Research Center.

In 1984, the National Academy of Sciences recommended initiation of a Global Tropospheric Chemistry Program (GTCP) in recognition of the central role of tropospheric chemistry in global change. Envisioned as the U.S. national component of an ultimately international research effort, the GTCP calls for the systematic study , supported by numerical modeling, of (1) biological sources of atmospheric chemicals; (2) global distributions and long-range transport of chemicals species; and (3) reactions in the troposphere that lead to the conversion, redistribution, and removal of atmospheric chemicals.

These research challenges demand a broadly-based program to address them. The resources required are distributed among several federal agencies, scores of universities, and a variety of scientific disciplines -- including atmospheric science, biology, land processes, and oceanography. It was already clear in 1984 that the National Aeronautics and Space Administration (NASA) would play a leading role in such a program. Some GTCP objectives require large-scale field studies and the most advanced instrumentation. NASA brings together unique research facilities, strength in atmospheric science, and technical expertise needed to achieve those objectives.

NASA's contribution to GTCP is the Global Tropospheric Experiment (GTE), which utilizes large, extensively instrumented aircraft -- ideal platforms for many atmospheric chemistry experiments -- as primary research tools. However, GTE has also drawn heavily upon satellite observations of meteorology, land use, and atmospheric chemical species to aid experiment design and in the scientific analysis of results obtained from aircraft and ground-based measurements.

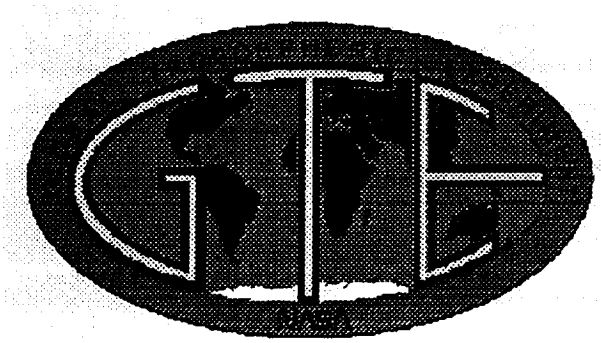
Understanding the chemical processes in the troposphere on a global scale is critical if we are to predict, and potentially ameliorate, harmful man-made changes to the global environment. The GTE was initiated as a series of global airborne measurement campaigns to address these issues. A series of rigorous airborne intercomparisons called the Chemical Instrumentation Test and Evaluation (CITE) experiments have evaluated our ability to measure critical tropospheric species; field studies known as Atmospheric Boundary Layer Experiment (ABLE) have studied major ecosystems that are known to exert a major influence on global chemistry and, in some cases, are undergoing profound changes; and the impact of long range transport of continental emissions, natural and anthropogenic, have been studied through focused missions such as the Transport and Chemistry near the Equator in the Atlantic (TRACE-A) experiments and Pacific Exploratory Missions (PEM) A and B.

The GTE group previously had a homepage located under the Atmospheric Sciences Division (ASD) of the NASA Langley homepage. My project for this summer was to revised the homepage into a more user-friendly homepage that directly addresses the importance of the experiment and perhaps more importantly provides direct access to results from the GTE missions.

The first step in my project was to design a preliminary outline of the homepage. The outline of the homepage consisted of the following: the main page, the three subpages and what each subpage would address, and the graphics that would go on each page. The first subpage on the homepage deals with the most frequently asked questions about GTE: "What is it?", "Why is it important?", "Where is it heading in the future?", etc. The second homepage addresses the origin and direction of the mission, as well as a brief overview of some of the missions, such as TRACE-A and PEM. The last subpage gives a more in-depth description of the GTE, along with a map that not only displays all of the past missions of the experiment, but also allows the user to link to other pages where data about the missions can be found. The user will be able to extract

the date from the files.

The GTE homepage will be online and available worldwide -- It is anticipated that there will be periodic updates to the homepage to include new missions as well as additional data from completed and future missions.

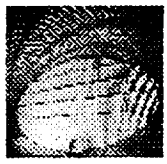


NASA Langley Research Center

Hampton, Virginia

Established in 1984

- **Frequently Asked Questions**
- **An Overview of the GTE**
- **In-depth Look at the GTE**

NASA Home Page  LaRC Home Page

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Last Updated: Sun Jun 8 13:30:50 EDT 1995
Mail Questions/Comments to Dennis Owen (d.w.owen@larc.nasa.gov)

GTE's Frequently Asked Questions

Here are some of the most frequently asked questions by our users. Hopefully, you will be able to find the answers to all of your questions.

- What is GTE?
  The Global Tropospheric Experiment (GTE) is a research program initiated by the National Aeronautics and Space Administration (NASA) designed to reveal the causes of atmospheric chemical change and to forecast their effects.

- Why is GTE important?
  The GTE is critical in that it helps scientists develop an understanding of the chemical cycles that control the composition of the troposphere, mainly, the air we breathe.

- What effects in the atmosphere are the GTE monitoring?
  There are three main effects that are being monitoref by the GTE. They are:
  (1)The biological sources of atmosphric chemicals,
  (2)The global distribution and long-rancge transport of chemical species, and,
  (3)The reactions in the troposhpere that lead to the conversion, redistribution, and removal of atmospheric chemicals.

- Where is the GTE heading in the future?
  NASA is currently in the process of planning two new missions in the GTE.

- How can one learn more about the GTE?
  If you want to learn more about the GTE, feel free to click onto the e-mail address below.

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The GTE is a large, multi-disciplinary program which is NASA's contribution to the National Academy of Sciences Global Troposhperic Chemistry Program. It is part of a comprehensive international research effort coordinated through the International Global Atmospheric Chemistry Program, which is a core project of the International Geospheric-Bioshperic Program. The GTE program utilizes large, extensively instrumented aircraft as its primary research tools. However, the program also draws heavily upon of satellite observations, meteorology, land use, and atmospheric chemical species to aid in experiment design and in the scientific analysis of results obtained from aircraft and ground-based measurements.

The greenhouse effect, acid rain, degradation of global air quality, and the tropospheric ozone depletion have all heightened worldwide awareness of the need for better understanding of the global troposphere, Projects carried out though GTE are responding to that need.

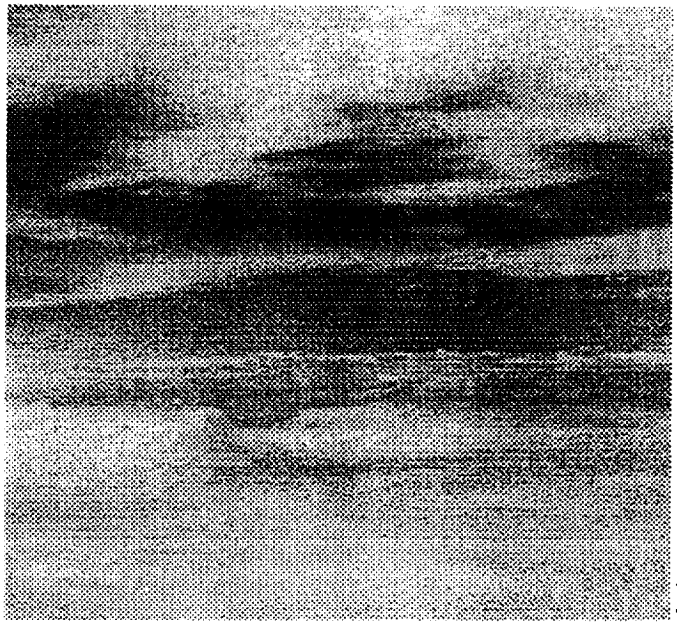
Such programs include CITE, ABLE, PEM, and TRACE.

The Chemical Instrumentation Test and Evaluation (CITE) projects were designed to foster the development of sensitive new instruments and techniquess to detect and amp concentrations of tropospheric trace gases in the parts-per-trillion range and below.

The Atmospheric Boundary Layer Experiments (ABLE) employed instrumentation on ground, air and space platforms to more fully understand the chemistry and dynamics of the troposhere, in particular the interactions between the biosphere and the atmoshpere.

The Pacific Explatory Mission (PEM) West projects investigated the atmospheric chemistry of ozone and its precursors (NOx, CO, methane, NMHC) over the western Pacific and the natural budgets of these species.

The Transport and Atmospheric Chemistry near the Equator - Atlantic (TRACE-A) expedition focused on understanding the seasonal enhancement in tropospheric ozone observed over the tropical south Atlantic Ocean.



Global Tropospheric Experiment

Established in 1984.

Wouldn't it be nice if every day the sky looked like the one in this picture. It looks very trusting, as if nothing were wrong. However, something is wrong with our atmosphere. The Global Tropospheric Experiment (GTE) was established to make sure that the air we breathe is still fit to live in. Read on for more details.

In 1984, the National Academy of Sciences recommended initiation of a Global Tropospheric Chemstry Program (GTCP) in recognition of the central role of troposheric chemistry in global change. Envisioned as the U.S. national component of an ultimately internationalresearch effort, GTCP calls for the systematic study, supported by numerical modeling, of (1) biological sources of atmospheric chemicals; (2) global distributionsand long-range transport of chemical species; and (3) reactions in the troposphere that lead to the conversion, redistribution, and removal of atmospheric chemicals. NASA's contribution to the GTCP is the Global Tropospheric Experiment (GTE), which utilizes large, extensively instrumented aircraft-ideal platforms for many atmospheric chemistry experiments-as primary research tools.

- **History**
- **Map of Missions and Mission's Data**

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