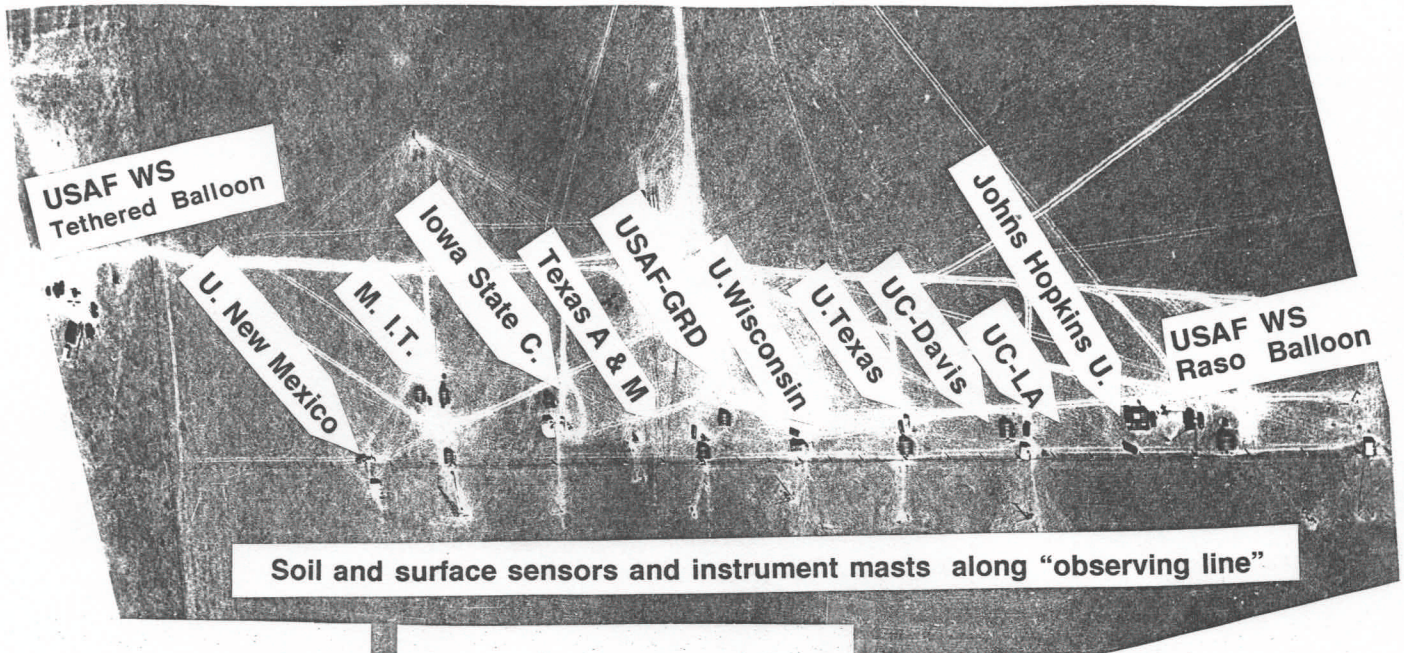
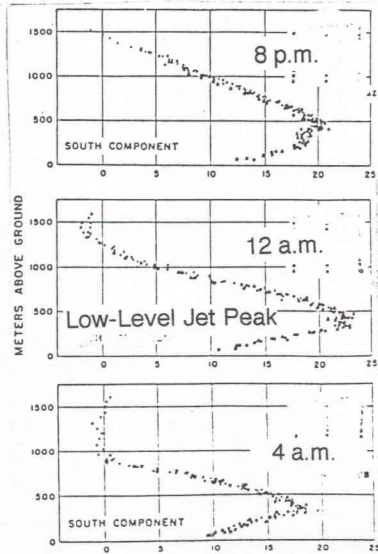


# Exploring the Atmosphere's First Mile

The Great Plains Turbulence Field Program, 1 Aug. - 8 Sep. 1953,  
Executed on U.S.A.'s flattest Prairie Country near O'Neill, Nebraska,



H.L. & Günter Löser



The Low-Level Jetstream



4000 Attend Open House Sunday At Wind Test Site



F. Brooks, K.L., & M. Halstead

North-Central Nebraska's BIG Newspaper  
Neill, Nebr., Thurs., Aug. 27, 1953

O'Neill, Nebr., Thursday, August 27, 1953.



## Doctor Lettau greeted in Helsinki by Soviet toasting 'O'Neill test'

Doctor Lettau, co-director of the so-called O'Neill wind test, addressed the following letter Aug. 18, 1984, to Carroll (Cal) Stewart, editor of the First National Bank's Centennial Souvenir Edition. He also forwarded "Exploring the Atmosphere's First Mile," a two-volume set published by Pergamon Press (London, New York, Paris). The work edited by Lettau and Ben Davidson, who was also at O'Neill during the summer of 1953, is the world scientific standard on low-level air turbulence.

By DR. HEINZ H. LETTAU

Co-Director, Great Plains  
Turbulence Field Program

Dear Cal:

I let my memory go back 31 years, and add what may be of general interest in later developments.

The Great Plains Turbulence Field Program, as described in the two volumes published by Pergamon Press in 1956, is not forgotten. The exceptionally ideal terrain around O'Neill had been carefully selected among other potential regions, up to the Dakotas, and due to this the scientific results of the venture are of lasting first-class quality, thanks to the devotion of the scientific people (see list of names and organizations on pages VII to VIII of Volume I).

Of course, nowadays some of the "pioneering" equipment looks cumbersome; for example, the recording, analyzing and computing electronic equipment shown on pages 211 and 212 of Volume I worked only in a special hut (air conditioned) while today much faster and more accurate results are obtained with calculators you could hold in your hand. Yet, most of the atmospheric and soils experiments produced data that consistently appear in technical articles of the international scientific community.

Let me avoid going into technicalities, but I simply must mention one of the highlights. This concerns the type of airflow which develops quite regularly when the terrain conditions are right. Try to interpret the graph which you can find on page 290 of Volume I. It shows that around midnight of Sept. 8, 1953, the air layer at about 1,200 feet rushed northward at a speed of 55 miles per hour (about 24 meter/second). In comparison, the air motion was modest at people or building heights, and most significantly, fully calm at about 4,000 feet and higher up. Such layers of fast-moving air are known as "atmospheric jet streams", and to distinguish this

phenomenon from the upper-atmospheric jet known to airline pilots and passengers, we speak of it as the "low-level jet". It occurs at various regions over the world, and atmospheric scientists pay much attention to its causes and theory. However, nowhere else but over O'Neill has the phenomenon been so splendidly documented.

This wind type has significance for agriculture too, because spores and germs may ride the current, being transported during one favorable night more than 300 miles northward.

Also the careful documentation of thermo-hydrologic soil data (see Fig. 2.2.3.1 in Volume I) still serves as a useful test case for models of soil moisture depletion and replenishment. In fact, O'Neill data will be used in one of my forthcoming publications, also in an invited lecture which I will present in October, 1984, in Vienna, Austria, at the Technische Universitaet fuer Boden Kultur.

With progress in time, the ranks of the people supporting the 1953-O'Neill venture began to thin out. Gone are such good friends as Buettner, Davidson, Glaser, Halstead, Thornthwaite, to name

only a few. But, the spirit of field experiments in atmospheric sciences, inaugurated on a great scale by our 1953 program, is alive and growing.

The two volumes of the O'Neill report were just completed during the time when I attended the 1956 Congress of the International Union of Geophysics and Geodesy at Toronto, Canada. The Pergamon Press people rushed one advanced copy to Toronto, and several scientists wanted the sample copy to

take home. Victorious was Dr. Obukhov of the USSR Academy of Sciences in Moscow, because he pleaded successfully with the Pergamon people that it would take a year before he would see a copy in Russia. IUGG has congresses every four years. The 1960 congress took place in Helsinki, Finland.

I arrived just in time for the first-evening cocktail party, and in the smoke-filled room packed with world-experts in the various fields of geophysics, Dr. Obukhov was waiting for me joyfully and greeted me saying, "Let's toast the O'Neill program first, and then on what we in Russia plan and are doing: The Great Steppe Field Program."

The frontpiece of Volume I of the two-volume report on the 1953 O'Neill wind test is reproduced below at less than half-size.

### EXPLORING THE ATMOSPHERE'S FIRST MILE

*Proceedings of the  
Great Plains Turbulence Field Program  
1 August to 8 September 1953  
O'Neill, Nebraska*

VOLUME I  
INSTRUMENTATION AND DATA EVALUATION

Edited by  
HEINZ H. LETTAU AND BEN DAVIDSON

Published by the  
Symposium Publications Division  
PERGAMON PRESS · LONDON · NEW YORK · PARIS

on behalf of the  
GEOPHYSICS RESEARCH DIRECTORATE  
AIR FORCE CAMBRIDGE RESEARCH CENTER  
AIR RESEARCH AND DEVELOPMENT COMMAND