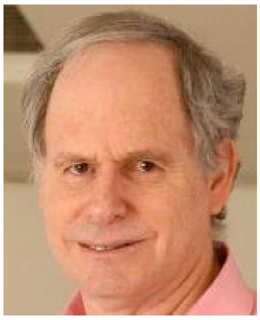
关于以色列希伯来大学的 Daniel Rosenfeld 院士学术报告通知

报告题目：Have we been underestimating aerosol effects on convective clouds and climate?



报告人：Prof. Daniel Rosenfeld, 以色列耶路撒冷希伯来大学, 欧洲文理科学院院士
联系人：俞绍才教授
报告时间：2017 年 12 月 21 日 10：00 -11：00 (星期四)
报告地点：浙江大学农生环大楼 C216 会议室

报告人简介： Dr. Daniel Rosenfeld is a professor at the Institute of Earth Sciences, The Hebrew University of Jerusalem, Israel. He is Member of the European Academy of Sciences and Arts, and fellows of AGU and AMS (欧洲文理科学院院士、美国地球物理联合会和美国气象学会会士). Prof. Rosenfeld received his Ph.D degree in 1986 from The Hebrew University of Jerusalem. During the last decade, Prof. Rosenfeld developed and validated hypotheses with respect to cloud aerosol interactions impacts on cloud microstructure and precipitation by a combination of aircraft in situ measurements, satellite remote sensing and model simulations. Danny has published more than 190 peer-reviewed journal publications, with papers published in Science (9 papers), Nature (1 paper), *PNAS (3 papers)*, *Nature-Geosciences etc*. His h-index is 64 by Google Scholar and 48 by ISI Web of Science. He was awarded a few prestigious research awards including the EMET prize for sciences, art and culture (2015, the highest Israeli scientific award) and the Friendship Award of the Peoples Republic of China (2009, the highest Chinese award for foreigners).

报告摘要：

Aerosol effects on clouds, precipitation and climate have been assessed until now mainly by comparing satellite observed cloud properties to aerosol optical depth (AOD). However, AOD is a crude and insensitive measure of cloud condensation nuclei (CCN). This resulted in large under-estimates and under appreciation of aerosol impacts on clouds. Newly developed methodology to retrieve CCN from satellite-measured cloud base drop concentration and updraft provides new capabilities, which resulted in new quantitative insights with respect to the magnitude of the impacts of aerosols on clouds and climate, from marine stratocumulus to deep convection. This presentation will focus on the impacts of CCN on deep tropical convective clouds. Some of the main insights are: (1) Additional CCN cause convective invigoration and deeper clouds. The effect saturates for CCN>~1000 cm^{-3}; (2) Additional CCN induce enhanced lightning activity, with a maximum around CCN = ~1000 cm^{-3}. Adding CCN beyond that reduces the lightning activity; (3) Additional CCN increases rain intensities, as well as the probability for large hail and tornadoes; (4) The aerosol convective invigoration induces enhancement of the regional monsoonal circulation. Based on the insights obtained so far it is clear that incorporating the aerosols into numerical weather prediction and constraining the simulations by the combined CCN and cloud observations is imperative to the advancement in the prediction skill for convective clouds and precipitation at all scales.

浙江大学环境与资源学院

2017 年 12 月 18 日