Earle Williams vendégprofesszor (Massachusetts Institute of Technology, USA) négy előadásból álló kurzust tart

Atmospheric Electricity:

Exploitation of the Global Circuit for Climate and Space Physics

címmel keddenként az MTA CSFK GGI előadótermében.

Az előadások kezdési időpontja 10 óra 30 perc.

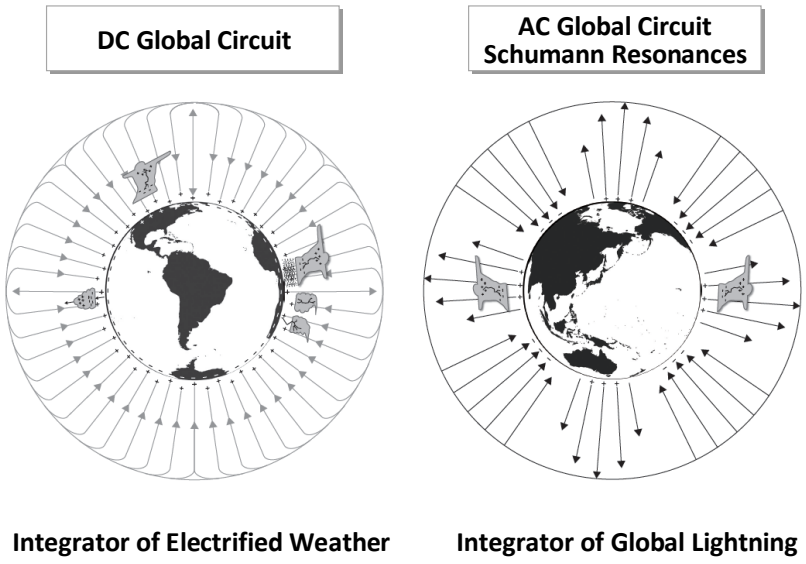
Outline for Short Course

Atmospheric Electricity: Exploitation of the Global Circuit for Climate and Space Physics

Earle Williams, Massachusetts Institute of Technology

Estimate 1 to 1.5 hours per lecture

Natural frameworks for monitoring global electrification



Lightning & Climate - 6
Earle Williams 12/05/12

Lecture 1: SOURCES FOR THE GLOBAL ELECTRICAL CIRCUIT (Tuesday, October 14)

Brief introduction to the DC and AC (Schumann resonances) global circuits
Thunderstorms and electrified shower clouds as sources for the global circuit
Key aspects of cloud microphysics that impact cloud electrification
The role of Convective Available Potential Energy (CAPE)
Expectation that lightning (and hence global circuit) will be responsive to temperature
Meteorological contrast between ordinary lightning and mesoscale lightning
Characteristics of mesoscale lightning that affect sprites, haloes and gigantic jets
Microphysical basis of mesocale lightning and giant positive ground flashes
Non-lightning sources for Schumann resonances

Lecture 2: THE MEDIUM OF THE GLOBAL ELECTRICAL CIRCUIT (Tuesday, October 21)

Where is the ionosphere for the DC and AC global circuits?
The 'Ignorosphere' and measurement problems (radar, satellite, TEC)
Ionosonde measurements and limitations for diagnosing SR cavity
Historical evolution of two characteristic heights of maximum dissipation
The contrast between daytime and nighttime ionospheres
The key role of monatomic oxygen for 'ledge' region, OH airglow layer, noctilucent clouds
Possible use of analysis of Q-burst transients in diagnosing propagation conditions
The polar asymmetry and recent evidence from ELF stations in Antarctica

Lecture 3: MECHANISM AND BEHAVIOR OF THE DC GLOBAL CIRCUIT (Tuesday, October 28)

The Carnegie curve of atmospheric electricity
Contrast with the UT diurnal variation of global lightning activity
The 'ionosphere' for the DC global circuit, and possible importance of whistlers
Wilson conduction currents from moist convection
The impact of nuclear weapons testing on the DC global circuit
Response of the DC global circuit to extra-terrestrial forcing
Possibilities for continuous monitoring—high altitude balloons

Lecture 4: INVERSION OF SCHUMANN RESONANCE BACKGROND OBSERVATIONS FOR GLOBAL LIGHTNING ACTIVITY (Tuesday, November 4)

Review of available methods for monitoring global lightning activity
Contrast in difficulty between locating Q-burst transients and the source of the background SR
The normal mode equation for the uniform cavity
Treatment of the non-uniform cavity
Sensitivity matrix approach to inversion—Vadim Mushtak approach
Green's function approach to inversion—Phil Nelson approach
Prospects for continuous global monitoring of global lightning in absolute units