

E-STAR: European Solar-Terrestrial and Atmospheric Research

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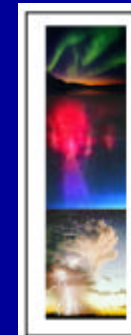
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K. G. Jeffery (UK)

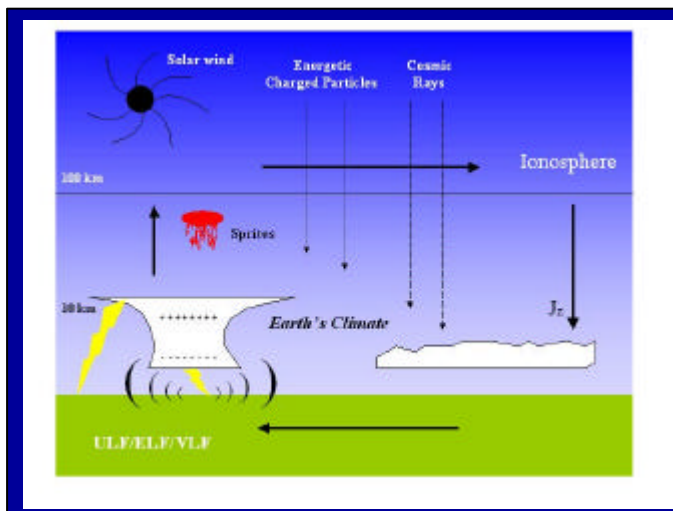
K. Labitzke (Germany)

J. Liliensten (France)

M.J. Rycroft (UK)



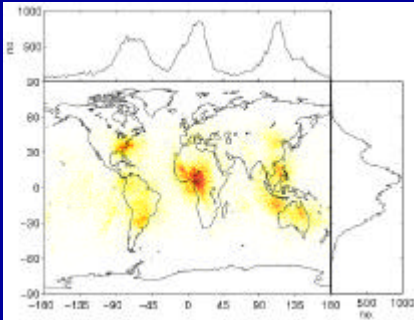
S Space
P Processes and
E Electrical
C Changes
I Influencing
A Atmospheric
L Layers



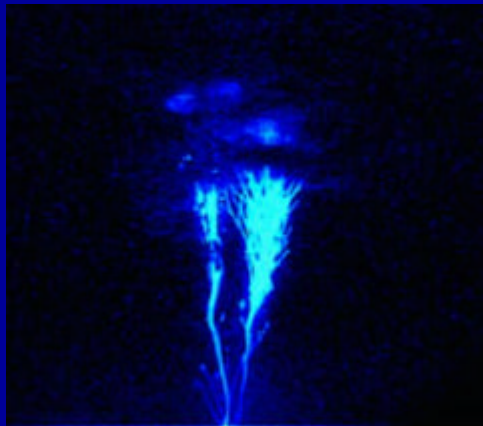
During fair weather, a potential difference of 200,000 to 500,000 Volts exists between the Earth's surface and the ionosphere, with a fair weather current of about 2×10^{-12} amperes/meter². It is widely believed that this potential difference is due to the world-wide distribution of thunderstorms.

An average of almost 1 ampere of current flows into the stratosphere during the active phase of a typical thunderstorm. Therefore, to maintain the fair weather global electric current flowing to the surface, one to two thousand thunderstorms must be active at any given time. While present theory suggests that thunderstorms are responsible for the ionospheric potential and atmospheric current for fair weather, the details are not fully understood. (Steve Goodman, 2003)



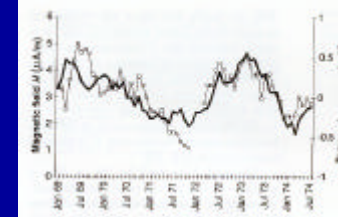


Lightning activity in April 1998, derived from global magnetic field recordings of Schumann resonances (4-20 Hz), with a network of three stations.
Füllekrug and Constable, GRL, 27, 333, 2000.

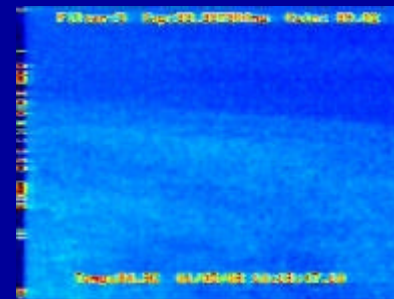
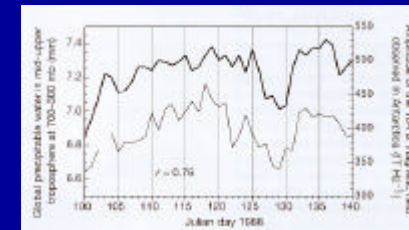


Pasko et al., Nature, 416, 152, 2002.

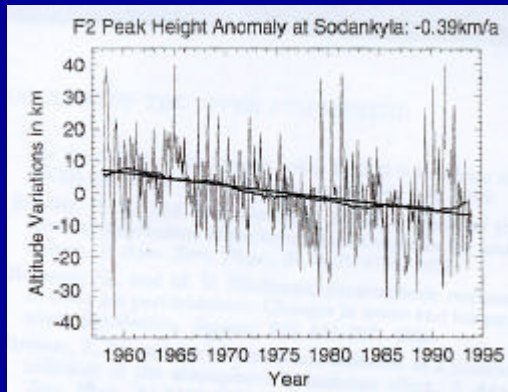
Wet bulb temperature anomaly in the tropics, well correlated with the El Niño southern oscillation. The magnetic field recordings is the amplitude of the first Schumann resonance at 8 Hz, recorded on the east coast of the US. Williams, Science, 256, 184, 1992.



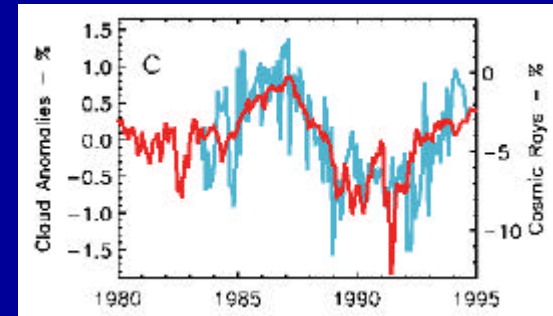
Price, Nature, 406, 290, 2000.



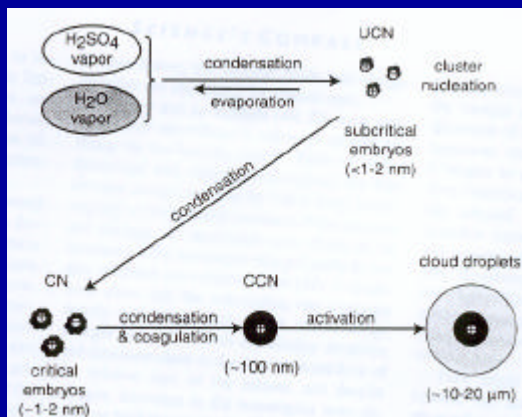
Columbia STS107, Meidex, Ilan Ramon, Yoav Yair, 2003.



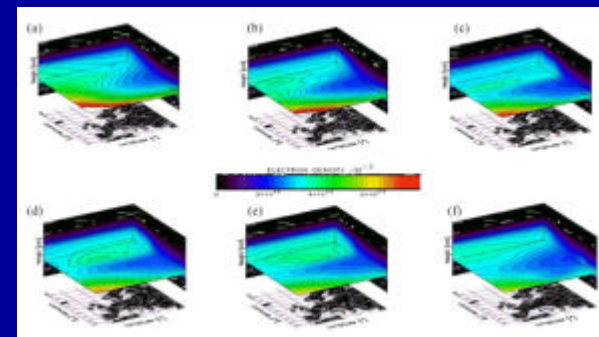
Ulich and Turunen, GRL, 24, 1103, 1997.



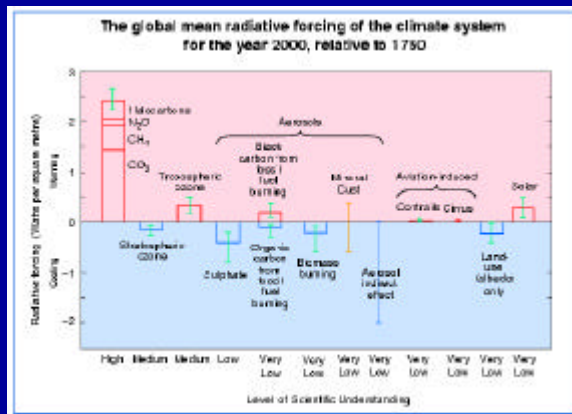
The cosmic rays are positively correlated with the low oceanic cloud cover but not with the middle and high clouds and also to a much lesser extent over the continents; Marsh and Svensmark, PRL, 85, 5004, 2000.



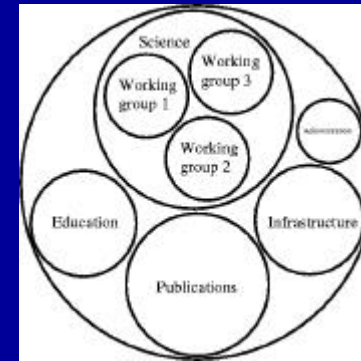
Carslaw et al., Science, 298, 1732, 2002.



Tomography of the total electron content from the analysis of GPS signal intensity across Europe with basis stations. Stolle et al., ASR, (submitted).

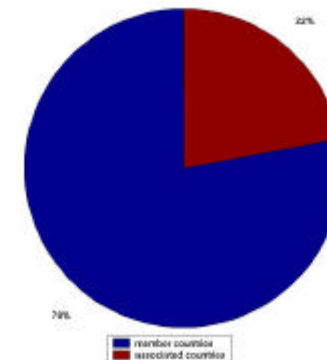


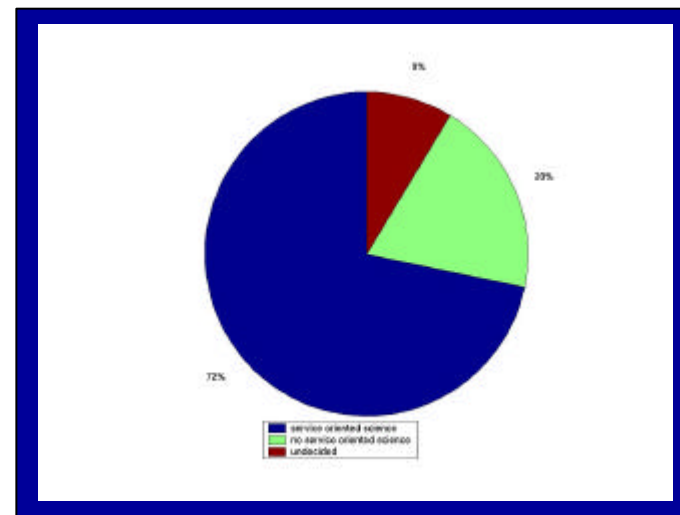
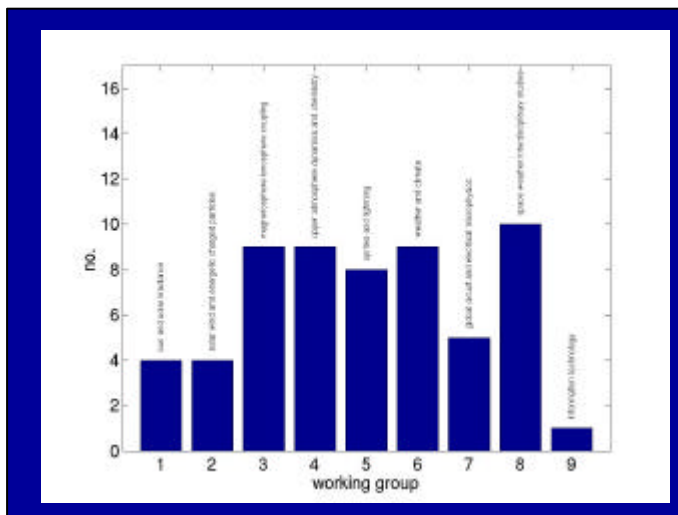
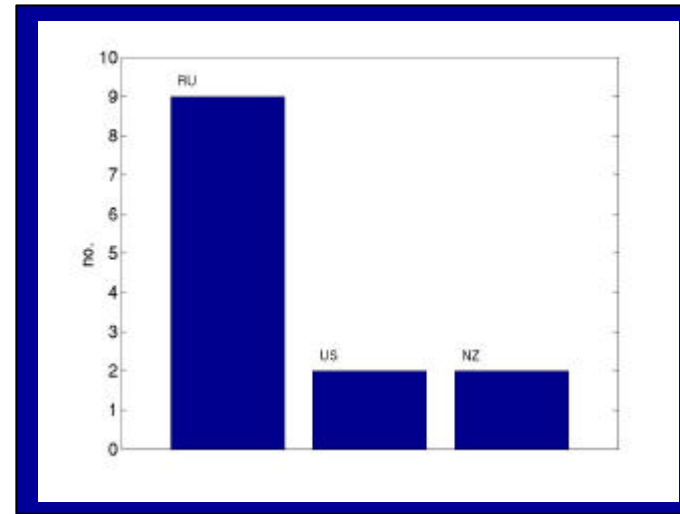
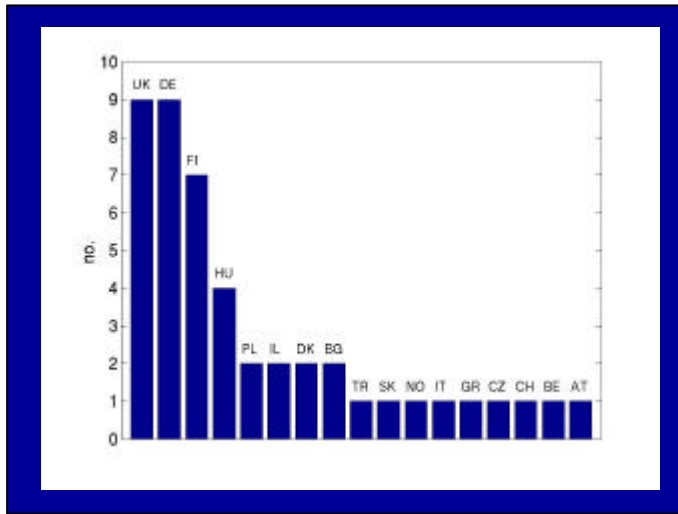
IPCC report, 2001.

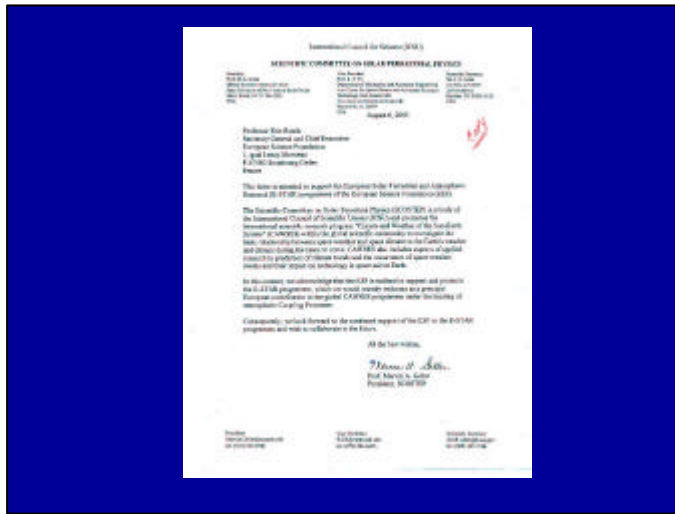


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ISU in Illkirch, France, November 27-28, 2003