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2009 : September 2009 - Fast Moving Fronts : Markus Rapp on Polar Mesosphere Summer Echoes

FAST MOVING FRONTS - 2009

September 2009



Markus Rapp talks with *ScienceWatch.com* and answers a few questions about this month's Fast Moving Front in the field of Geosciences.



Article: Polar mesosphere summer echoes (PMSE): review of observations and current understanding

Authors: Rapp, M;Lubken, FJ

Journal: ATMOS CHEM PHYS, 4: 2601-2633 DEC 21 2004

Addresses: Leibniz Inst Atmospher Phys, Schloßstr 6, D-18225 Kuhlungsborn, Germany.

Leibniz Inst Atmospher Phys, D-18225 Kuhlungsborn, Germany.

SW: Why do you think your paper is highly cited?

The paper reviews our current knowledge regarding polar mesosphere summer echoes, (PMSE) the understanding of which had bothered the scientific community for more than 20 years. In our review paper, we show that there is now compelling evidence that these radar echoes are direct evidence of ice clouds in the upper mesosphere (80-90km), where many colleagues believe that climate change signals should be much larger than in the troposphere.

Since ice cloud microphysics should very strongly react to changes in temperature or water vapor, one could hence regard observations of these ice clouds as a magnifying glass of the thermal structure of this part of the atmosphere.

SW: Does it describe a new discovery, methodology, or synthesis of knowledge? Would you summarize the significance of your paper in layman's terms?

It describes a synthesis of knowledge. We have shown that ice clouds which occur some 70km above ordinary clouds in the upper mesosphere can be routinely observed by comparably simple ground-based radar systems. This gives us a direct observing window to this altitude range, which is suspected to be quite sensitive to climate change.

SW: How did you become involved in this research and were any particular problems encountered along the way?

I started my work in this field as an undergraduate research assistant working on my M.Sc. thesis in physics. Both the scientific objectives and experimental techniques—sounding rockets, radars, lidars, and satellites—were so fascinating to me that I

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decided to stay within this particular field of research. During my career, I've received considerable support from my advisors and mentors and can gladly say that there were no particular problems encountered along the way.

SW: Where do you see your research leading in the future?

Having established a solid physical basis which enables us to interpret observations of PMSE quantitatively, we can now use them as climate monitors or, more generally, as suitable tools to study physical processes such as that of waves and turbulence in the upper mesosphere.

SW: Do you foresee any social or political implications for your research?

The forthcoming years will need to show whether this altitude range of our atmosphere is indeed an ideal predictor for detecting climate change.

Prof. Dr. Markus Rapp
Head of Department
Dept. Radars and Sounding Rockets
Leibniz-Institute of Atmospheric Physics
University of Rostock
Kuehlungsborn, Germany

Web

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PDF

[back to top](#)

2009 : [September 2009 - Fast Moving Fronts](#) : Markus Rapp on Polar Mesosphere Summer Echoes

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