



## **Recent advances in environmental monitoring using commercial microwave links**

Pinhas Alpert, Oded Guez, Hagit Messer, Noam David, Oz Harel, Adam Eshel, and Ori Cohen  
Tel Aviv University, Tel Aviv, Israel (chais@post.tau.ac.il)

Recent advances in environmental monitoring using commercial microwave links

Pinhas Alpert, H. Messer, N. David, O. Guez, O. Cohen, O. Harel, A. Eshel  
Tel Aviv University, Israel

The propagation of electromagnetic radiation in the lower atmosphere, at centimeter wavelengths, is impaired by atmospheric conditions. Absorption and scattering of the radiation, at frequencies of tens of GHz, are directly related to the atmospheric phenomena, primarily precipitation, oxygen, mist, fog and water vapor.

As was recently shown, wireless communication networks supply high resolution precipitation measurements at ground level while often being situated in flood prone areas, covering large parts of these hazardous regions. On the other hand, at present, there are no satisfactory real time flash flood warning facilities found to cope well with this phenomenon. I will exemplify the flash flood warning potential of the commercial wireless communication system for semi-arid region cases when floods occurred in the Judean desert in Israel with comparison to hydrological measurements in the Dead Sea area.

In addition, I will review our recent improvements in monitoring rainfall as well as other-than-rain phenomena like, fog, dew, atmospheric moisture.

References:

N. David, P. Alpert, and H. Messer, "Technical Note: Novel method for water vapor monitoring using wireless communication networks measurements", *Atmos. Chem. Phys.*, 9, 2413-2418, 2009.

A. Rayitsfeld, R. Samuels, A. Zinevich, U. Hadar and P. Alpert, "Comparison of two methodologies for long term rainfall monitoring using a commercial microwave communication system", *Atmospheric Research* 104–105, 119–127, 2012.

N. David, O. Sendik, H. Messer and P. Alpert, "Cellular network infrastructure-the future of fog monitoring?" *BAMS* (Oct. issue), 1687-1698, 2015.

O. Harel, David, N., Alpert, P. and Messer, H., "The potential of microwave communication networks to detect dew using the GLRT- experimental study", *IEEE Journal of Selected Topics in Applied Earth Observations and Remote Sensing*, 2015.