



Advances in flood monitoring using commercial microwave links

Pinhas Alpert (1), Yonatan Laron (2), Hagit Messer (3), Noam David (4), and Adam Eshel (1)

(1) Tel-Aviv University, Tel-Aviv University, Geophysical, Atmospheric & Planetary Sciences, Tel-Aviv, Israel (pinhas@post.tau.ac.il), (2) Ben Gurion University, Geography, Beer Sheva, (3) Tel-Aviv University, Faculty of Engineering, Tel Aviv, (4) Cornell University, Cornell

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. 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 will be exemplified. The potential of MW cellular data to improve hydro-meteorological modelling will be highlighted.

References:

P. Alpert, H. Messer and N. David, "Meteorology: Mobile networks aid weather monitoring", *Nature*, 537, 617, (29 September 2016), doi:10.1038/537617e

N. David, P. Alpert and H. Messer, "The potential of cellular network infrastructures for sudden rainfall monitoring in dry climate regions", *Atmospheric Research*, 131, 13-21, 2013.

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.

I. Shentsis, J. B. Laronne and P. Alpert, "Red Sea Trough flood events in the Negev, Israel (1964–2007)", *Hydrological Sciences Journal – Journal des Sciences Hydrologiques*, 57(1), 42-51, 2012.