

Military safety is blowing in the wind

October 17 2012

A command doctrine used by the US military and NATO designed to warn personnel of Nuclear, Chemical and Biological (NBC) hazards could be overly conservative and degrade war fighting effectiveness or, under certain conditions, risk lives because it is susceptible to changes in wind direction and speed that happen in periods shorter than its two-hourly updates.

Writing in the *International Journal of [Environmental Pollution](#)*, Nathan Platt and Leo Jones of the Institute for Defense Analyses, in Alexandria, Virginia explain how "Allied Tactical Publication-45(C)" relies on two-hourly updates to create an area warning map showing where [NBC](#) risks are apparent. Abrupt changes in wind speed, they say, could lead to significant false negatives or false positives for a given hazard area. The team has now developed a methodology using a transport and [dispersion](#) (T&D) model that could alleviate this problem by factoring in changes in wind.

The researchers explain that ATP-45(C) provides military personnel and commands with a warning area constructed using a set of circles and triangles, the geometric parameters of which (e.g., length and type) are generated based on wind speed and direction, magnitude and type of chemical attack and whether or not the chemical agent is considered persistent. The templates are updated at two-hourly intervals and thus do not account for variations of [wind speed](#) and direction, that occur on timescales shorter than two hours. Such a shortcoming could lead to incorrect orientation of the "triangle" template. Moreover, Platt and Jones point out that an [abrupt change](#) in the template from "circle" to

"triangle" around the 10 km/h speed can distort the warning area to the detriment of at-risk military personnel.

The team's modeling approach advocates using a T&D model that can produce a time-dependent warning area in shorter than two-hour time increments, consistently handle risk, and depending on the T&D model's capabilities, could utilize additional local meteorological and terrain information. The team suggests that using a T&D model could supplement the ATP-45 hazard template in either fixed duration warning area for varying uncertainty in wind direction or for snapshots of the warning area for predetermined times and uncertainty in [wind direction](#) and/or speed.

However, "if these suggestions on the use of a T&D model to supplement ATP-45 hazard area templates are to be contemplated, then the actual values to be used require further analyses and concurrence within the Chemical and Biological Defense (CBD) community," the researchers conclude.

More information: "Potential use of Transport and Dispersion model output to supplement Allied Tactical Publication-45 hazard area prediction templates" in *Int. J. Environment and Pollution*, 2012, 48, 30-38

Provided by Inderscience Publishers

Citation: Military safety is blowing in the wind (2012, October 17) retrieved 11 July 2024 from <https://phys.org/news/2012-10-military-safety.html>

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