LAMP Convection / Total Lightning Probability and “Potential” Guidance: An Experimental High-Resolution Upgrade
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Key Points
Automated 1-25 h guidance for aviation, fire weather, and public safety
Presently-operational 2-h convection and lightning guidance has insufficient spatial and temporal resolution
Developed experimental 1-h convection and lightning guidance with higher resolution (hi-res), which incorporates new hi-res datasets
Presently being evaluated by field users
Early feedback very favorable

How is Convection or Total Lightning (TL) Event Defined?
Convection = ≥ 40 dBZ refl. or ≥ 1 total lightning (TL=cloud+ground) flash within 1-h period and 20-km gridboxes spaced 10-km apart
TL = lightning component of convection definition

How is Convection or TL Probability Produced?
Use regression equations stratified hourly, seasonally, and geographically
Equations developed and applied on 10-km grid
Predicators based on –
• latest fine scale MRMS and TL initial and advected observations grids (obs)
• fine scale HRRR model output
• large scale GFS- and NAM-based MOS convection or TL probability
• not previously used in LAMP

BSS features –
• Very high skill in 1st few projections due to obs
• HRRR yields substantial skill to 17 hours; HRRR not used afterward
• HRRR contribution to skill larger for convection than TL
• Skill generally higher in cool season, weakest for summer
• Obs skill highest during spring
• GFS/NAM MOS skill relatively weak
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• not previously used in LAMP

Features in example case -
• Exp. 1-h convection and lightning probs show higher spatial detail than 2-h operational probs
• Fine detail from obs for short projections is extended to longer projections by HRRR
• Convection prob coverage and sharpness is higher than for TL

From Probability to Potential
Specify 4 potential categories from 3 pre-derived probability thresholds

Conclusions / Plans
Achieved hi-res (1-h) objective in convection and TL guidance without sacrificing skill
Hi-res achieved by applying fine-scale MRMS and TL obs plus fine-scale HRRR model output
Expect experimental guidance to replace operational in early 2017

Websites
Convection = http://www.nws.noaa.govmdl/lamp/conv1h.php
Total lightning = http://www.nws.noaa.govmdl/lamp/tlg1h.php

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