



Tornado Vortex and Wind Speed Detection by X-Band Phased Array Radar

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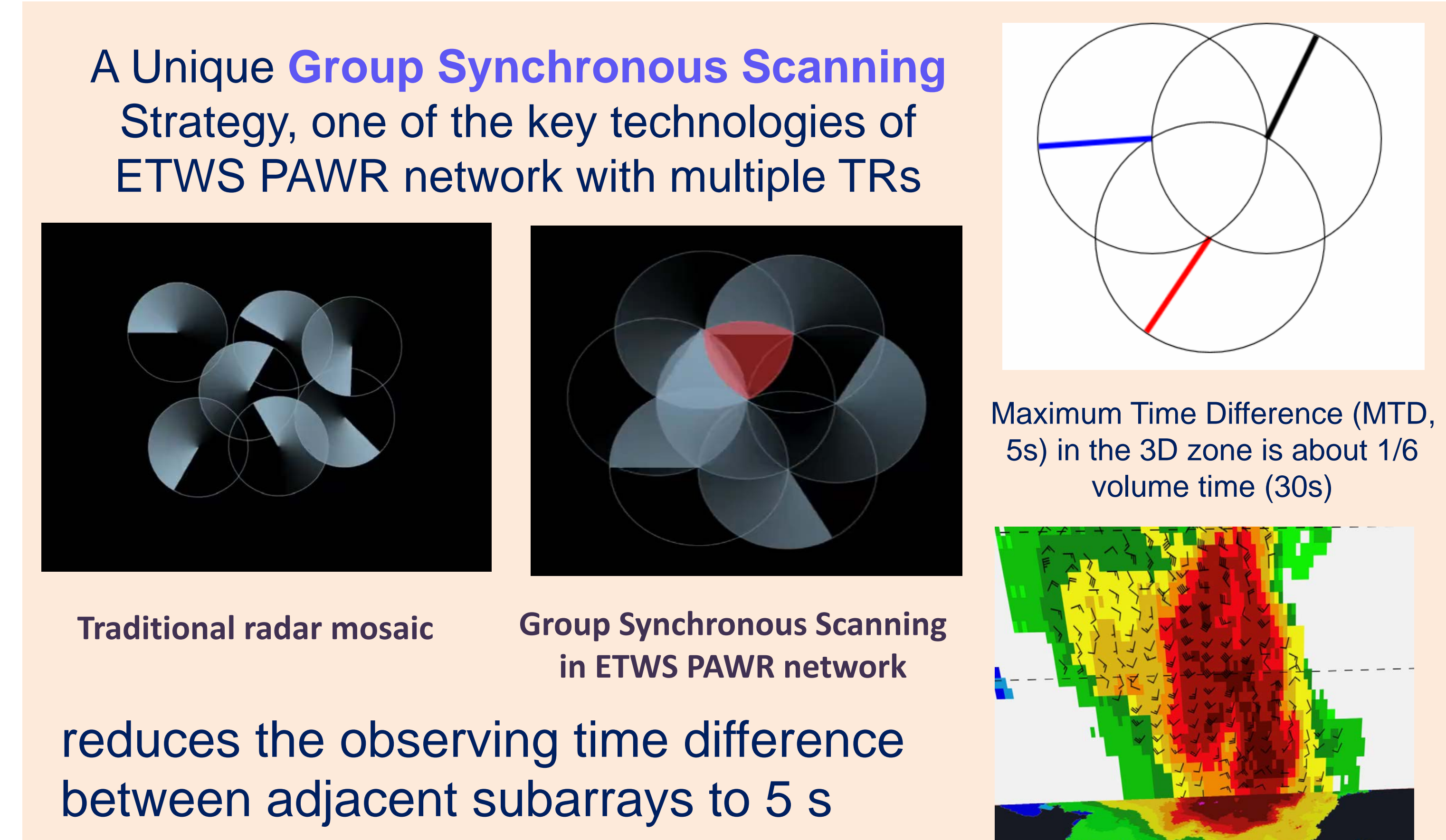
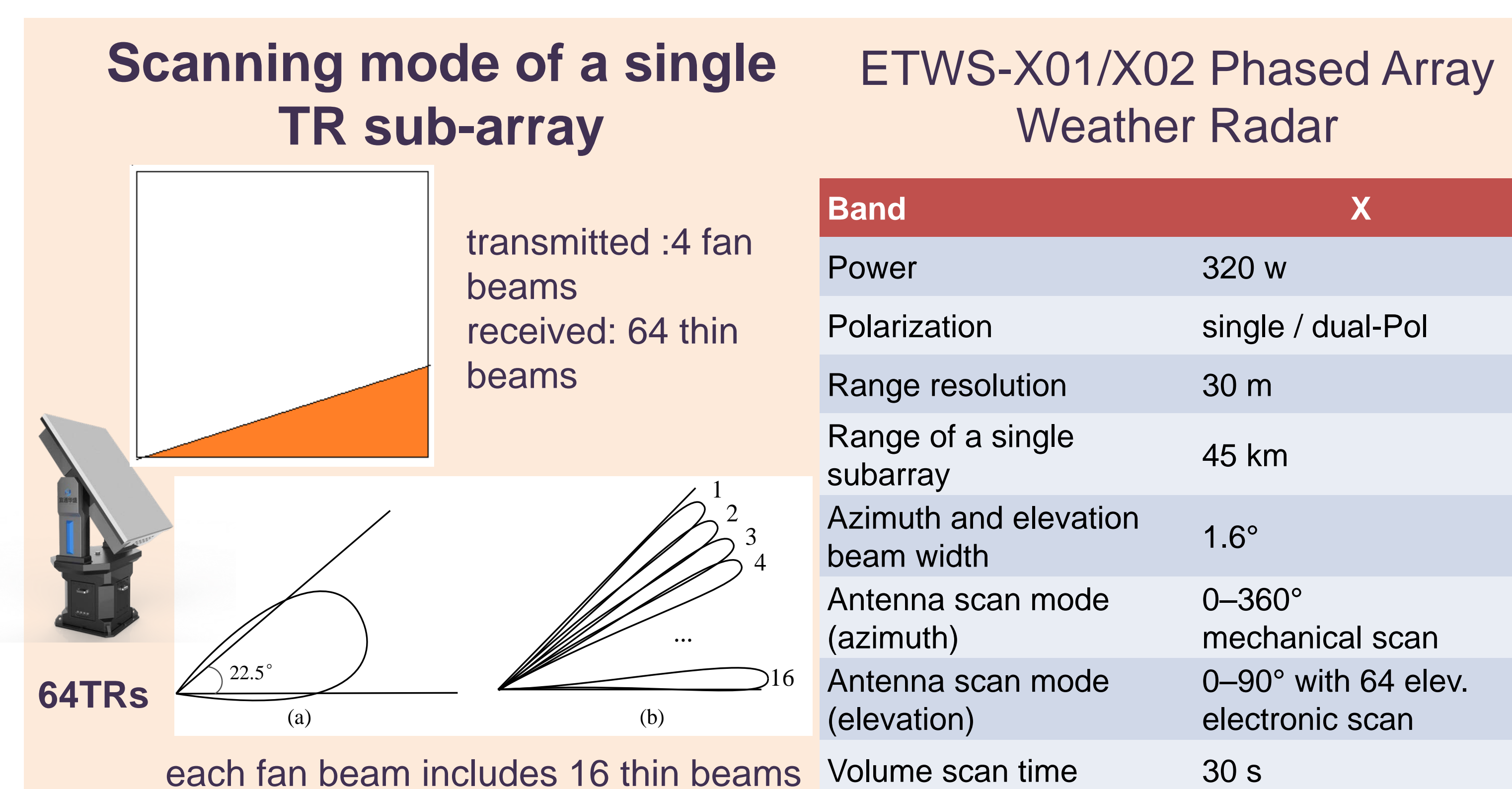
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3. Joint Laboratory of Phased Array Weather Radar, East China Meteorological Region and Eastone Washon Tech.

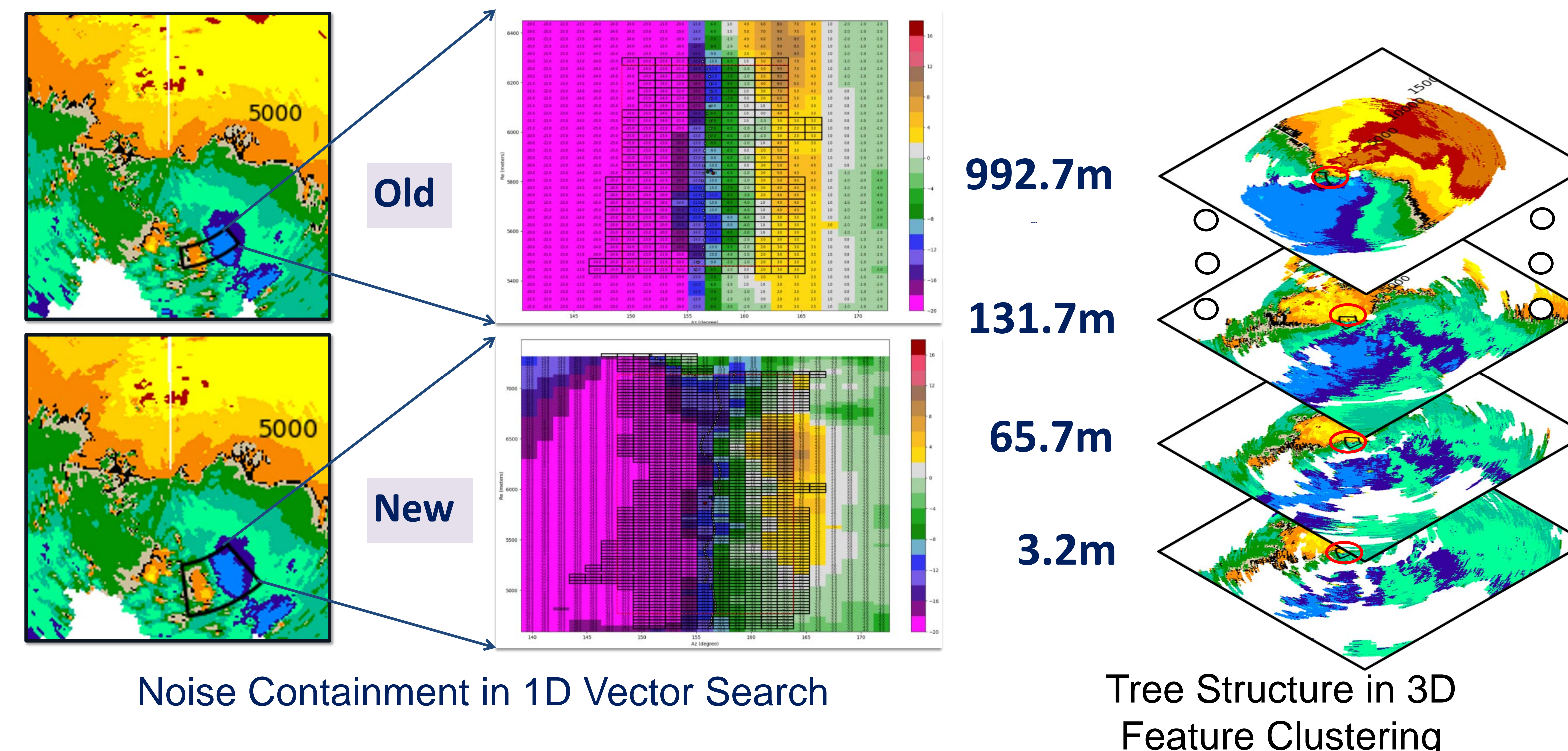
4. Shanghai Meteorological Information and Technical Support Center, China



Poster: V46



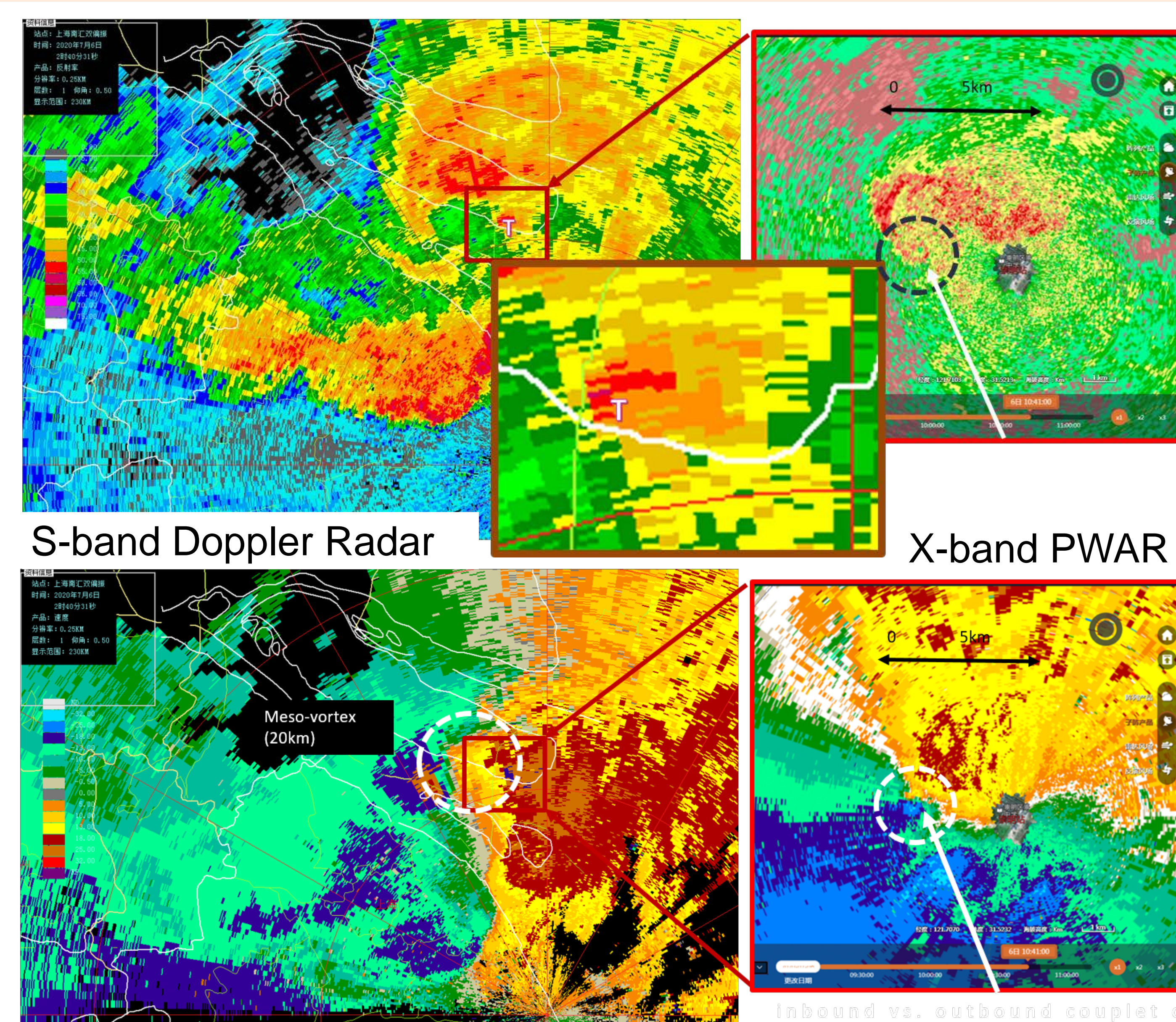
A new algorithm for micro-scale vortex detection



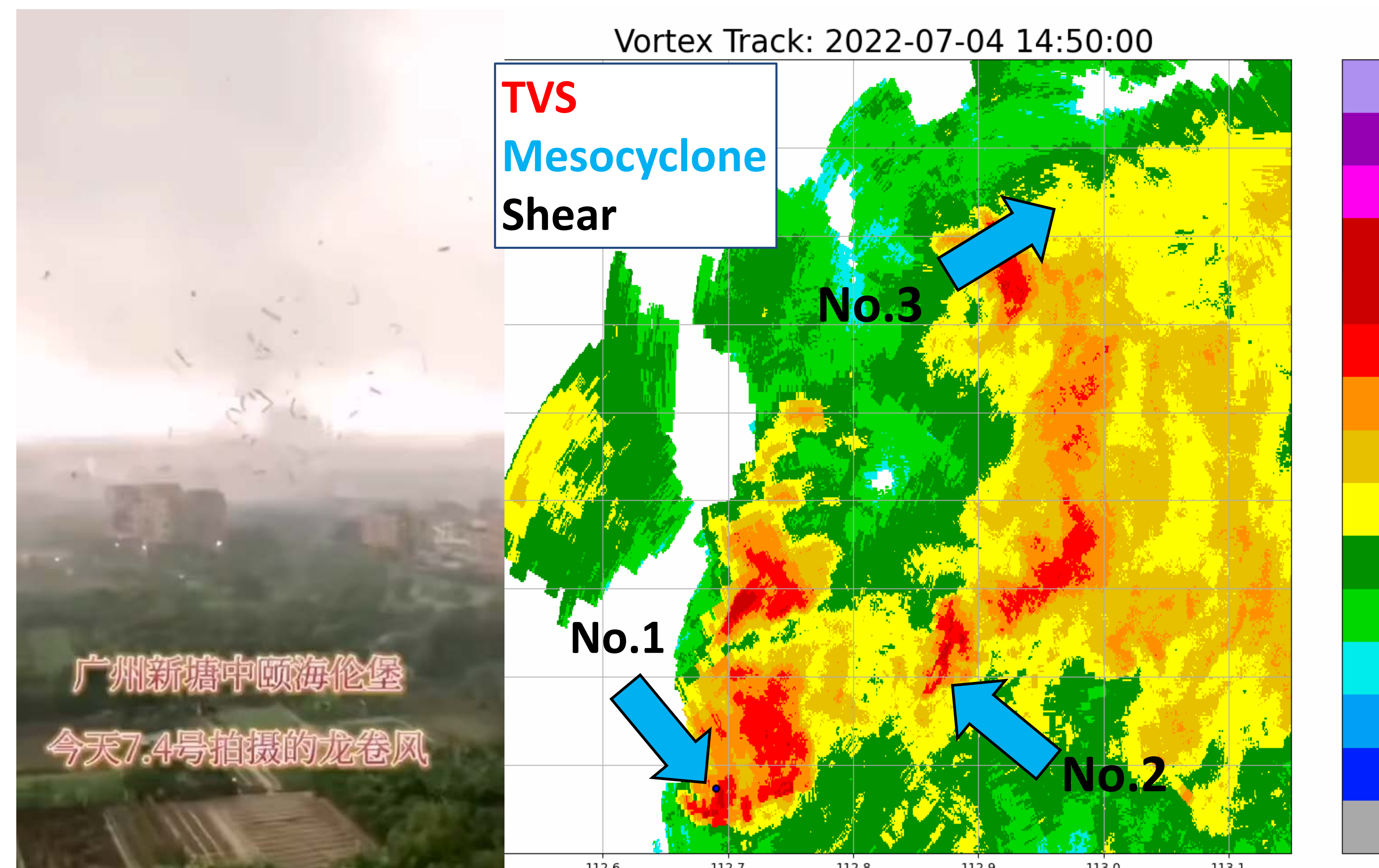
Outputs: max inbound/outbound wind speeds, core diameter, azimuth shear, and vorticity of a micro-scale vortex

- 1) improving one-dimensional vector recognition based on noise containment in **1D vector search**;
- 2) improving the calculation strategy of multi-threshold layer-by-layer filtering in **2D feature filtering**;
- 3) using an optimal similarity screening technique based on the tree structure in **3D feature clustering**.

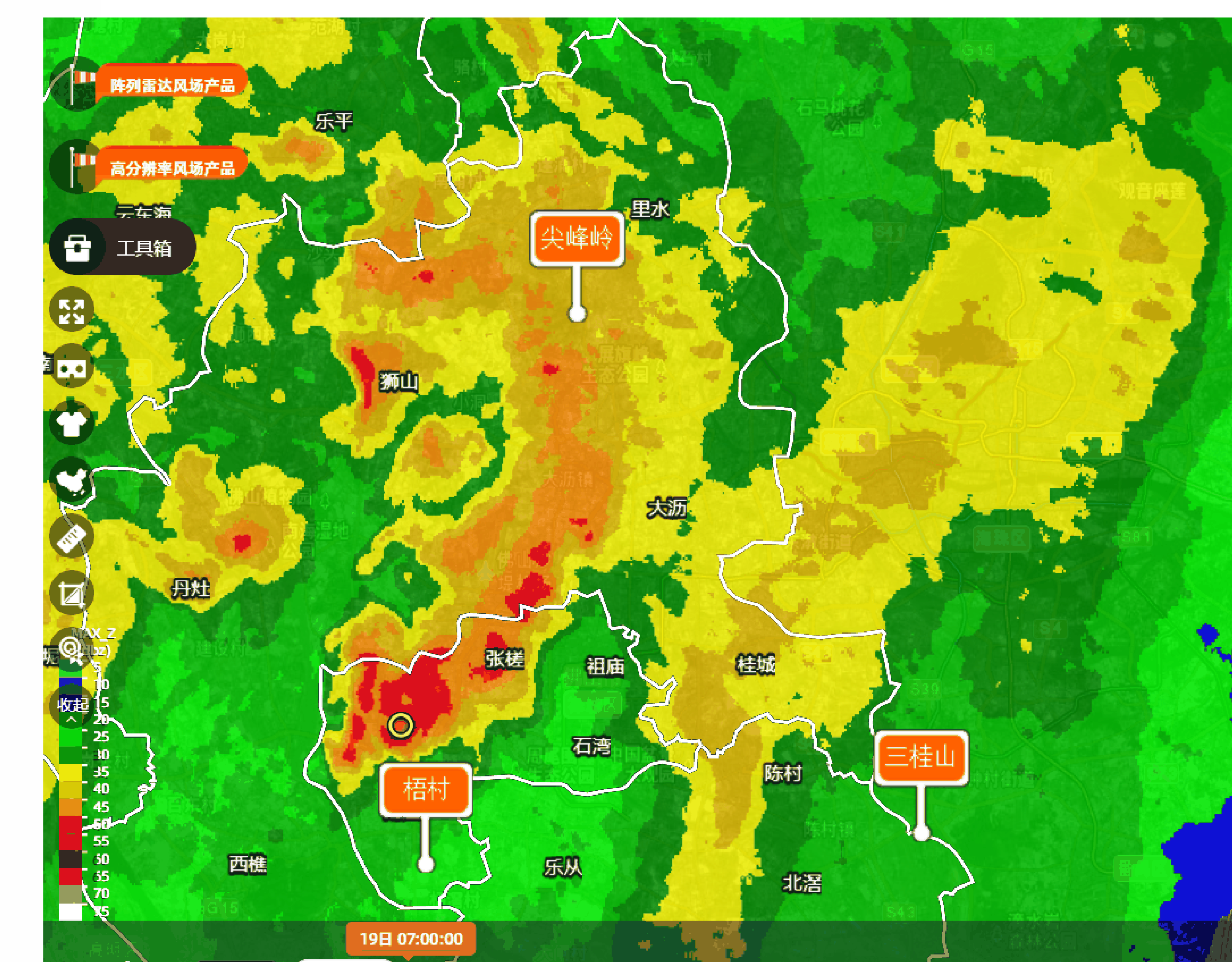
Compared to the WSR-88D MDA (Mesocyclone detection algorithm), it improves the capture ability of **small-scale vortex detection** in high spatial resolution data and the continuity of vortex tracking in high temporal resolution.



A mini-supercell with a tornado



Three mini-supercells embedded in the outside rain bands of Typhoon 'Chaba' were detected by PAWR on Jul. 4, 2022. TVS (15:23-15:39), possible lead time of the 15:32 tornado could be 9-15 minutes.



Jun. 19, 2022, detected TVS at 07:08, possible lead time was about 12 minutes.