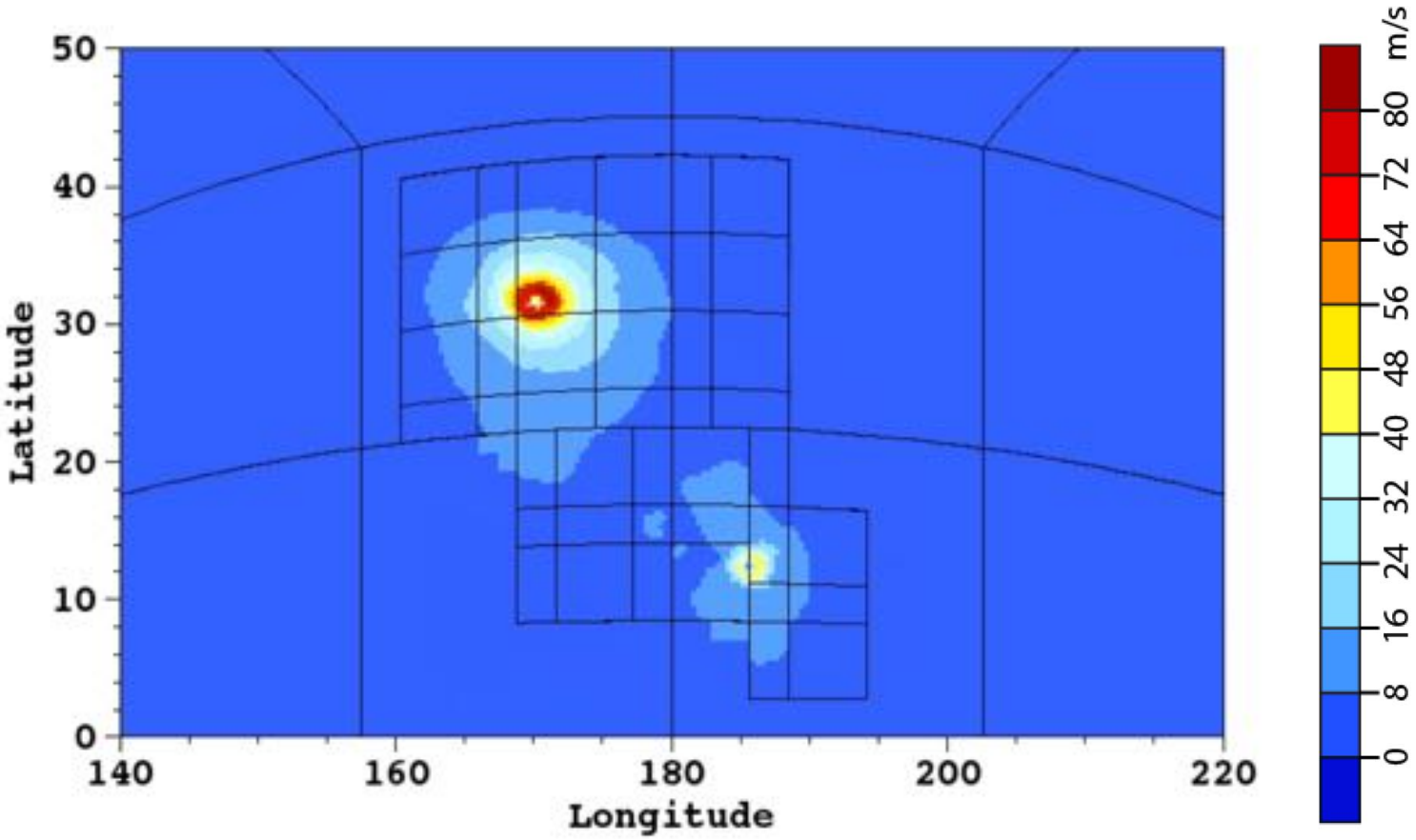
Bridging regional and site specific scales with AMR

Adaptive Mesh Refinement (AMR) enables:

- Capturing features on dynamic, high-resolution meshes (1000:1 feasible)
- Locally-adaptive orography / topography, and using dynamic criteria
- Greater accuracy in space and time, save 10-100x in computational cost



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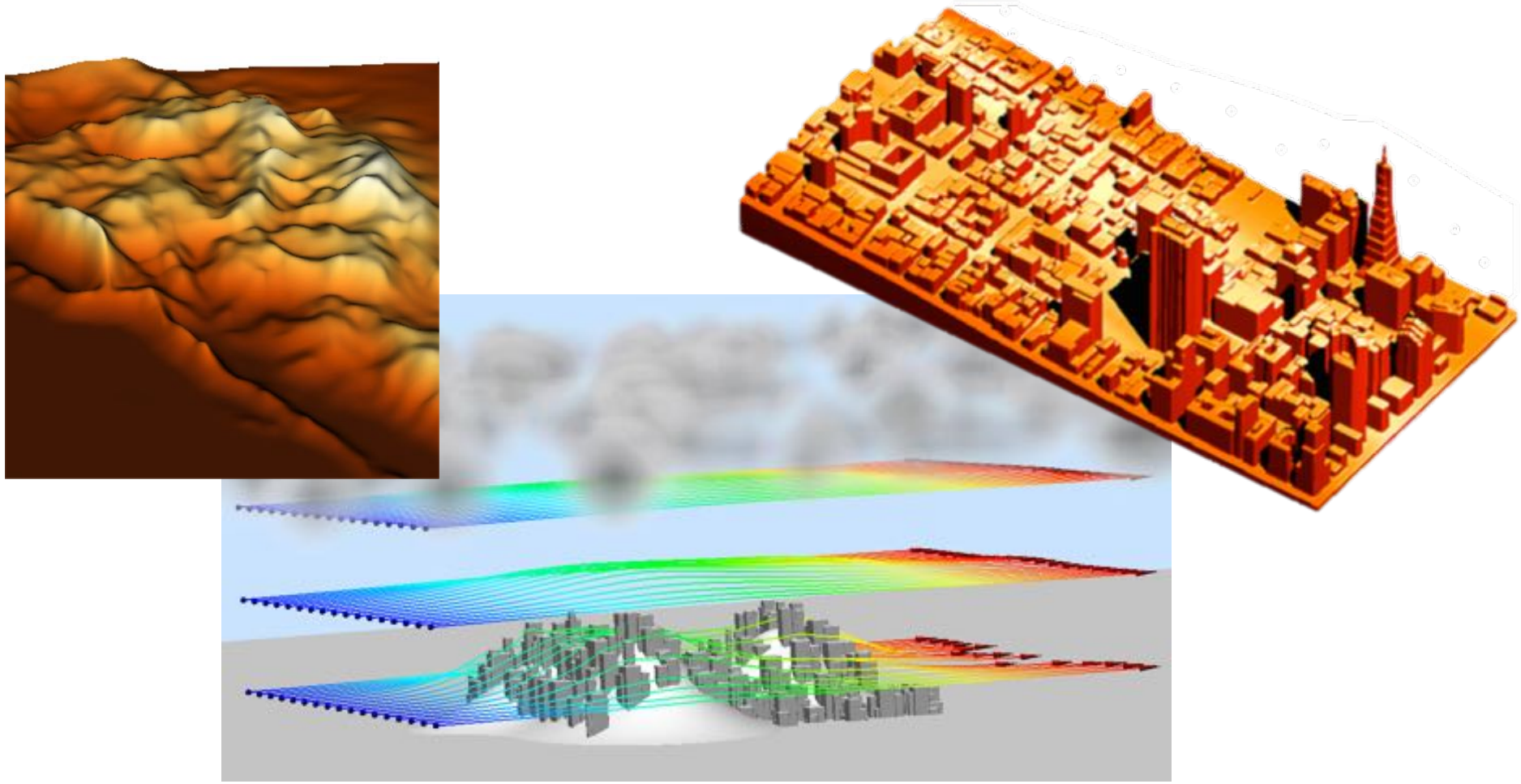
Complex geometries require different resolutions

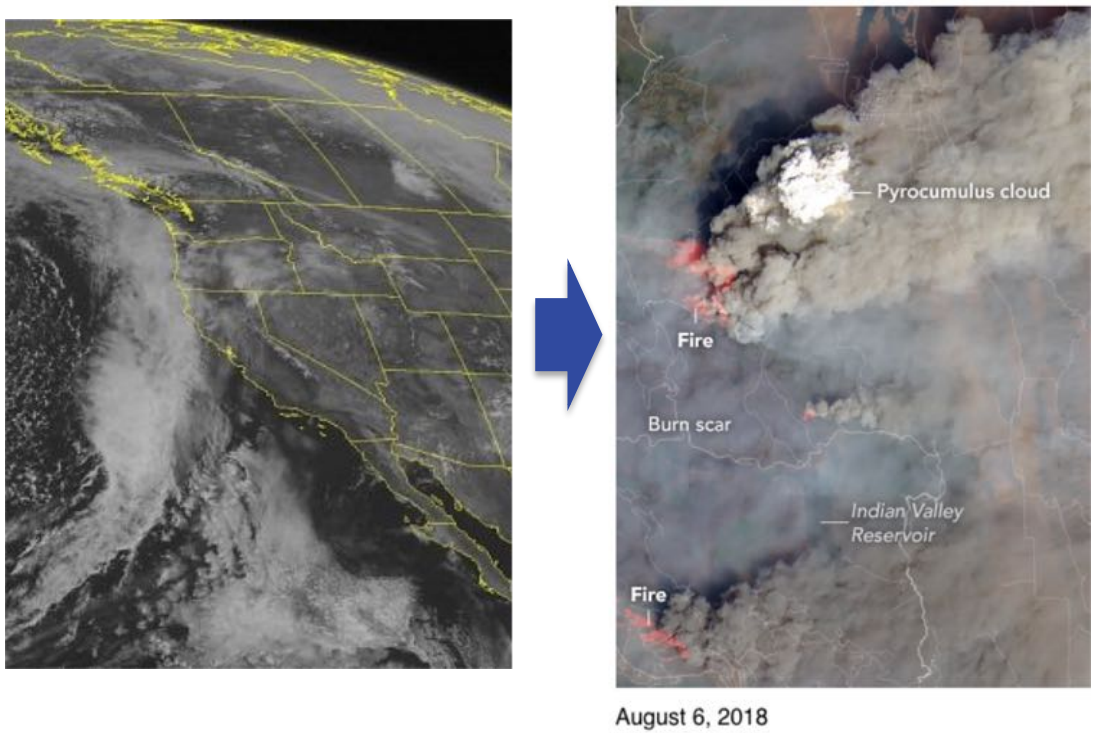
AMR with cut cell techniques supports rapid creation of regional models, with fine topographic features or even man-made infrastructure.



Wildfire-related opportunities for LBNL capabilities

Near term we could integrate into a wide array of simulation needs:

- Cut cells + AMR quickly represent small features in regional context
  - Could pre-generate high-resolution orographic meshes in high-risk regions
- Fire/surface models integrated into real-time regional CFD
  - Could look at fire risk vs. weather timing, air quality, satellite observations



- What kinds of simulations can help quantify high-risk?
- Can real-time simulation + observation help responses?
- What can simulations do to help prioritize and optimize fire prevention investments?