connects to the high-speed Internet provided by the UW College of Engineering Computer-Aided Engineering (CAE) network, and an Uninterrupted Power Supply (UPS) device for power backups. The distributed HPC has a submitting server at the Center for High Throughput Computing in UW-Madison and utilizes computing nodes on the Open Science Grid (OSG). The secure web server is hosted by the CAE stack system. To schedule automated processing, MATLAB scripts are written in the master node. Recorded image snapshots and other environmental data are distributed to the local HPC computing nodes for immediate processing while the 10-min video images are submitted to the distributed HPC grids on the waiting queue to available free nodes. After computations are completed, processed data is compiled in the master node and then uploaded onto the INFOS web server. Image processing and flash rip hazard likelihood assessment are described in the following two sub-sections.

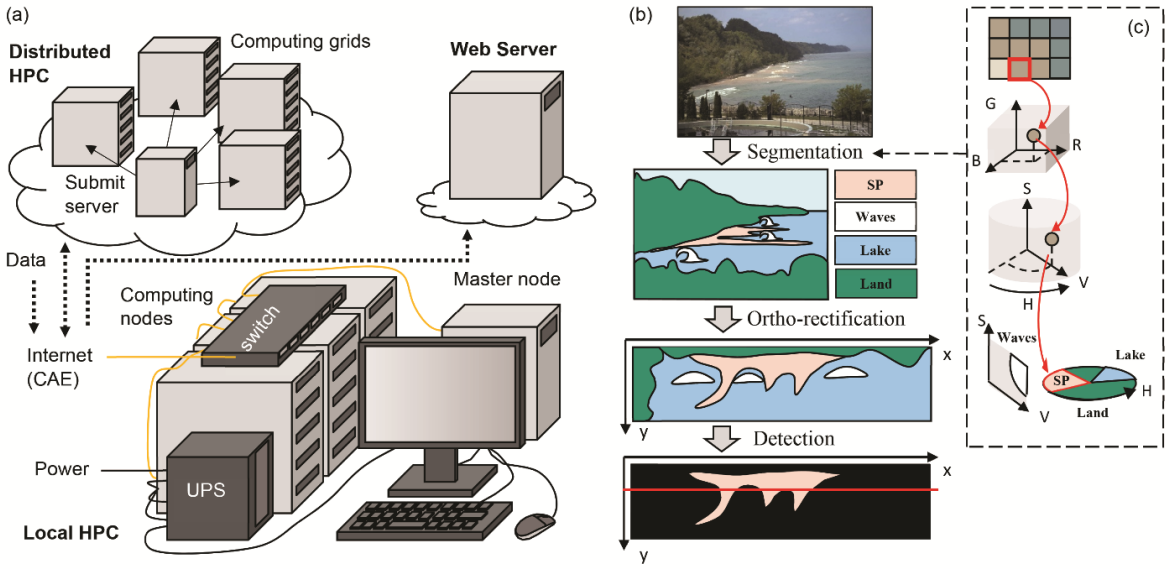

Fig. 2-3. (a) Computing infrastructure of the Integrated Nowcast Forecast Operation System (INFOS) consists of a local HPC, a distributed HPC, and a web server. (b) Three-step image processing of INFOS are segmentation, ortho-rectification, and flash rip detection. (c) In segmentation step, each pixel is transformed from RGB values to HSV values.