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The role of convective parameterization in NWP model and how to make it scale aware

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A convective parameterization scheme (CPS) is one of the most crucial factors which may determine the performance of Numerical Weather Prediction (NWP) model. A CPS calculates the timing, location and strength of convection cells using model's grid point values (large scale values). The most common form of a CPS is mass-flux type closure method which use a plume model to estimate a subgrid scale convective activities. In this method, the large scale or grid resolved flows regulates the subgrid scale convection and the convective activity feedback to the large scale. Therefore, these CPSs basically assume that the quasi-equilibrium between subgrid scale convection and grid scale flows; and the convective areal portion is much smaller than that of grid mesh. Because computer power increases exponentially, the most global model start to approach the horizontal resolution of 10km or less not to mention regional models. As a result, the aforementioned basic assumption of mass flux type CPS – negligible convective area - begins to break down in the global models. The is so-called CPS gray-zone problem and the resolution of the CPS gray-zone is about 1-10km ranges. In the gray-zone resolution, the convectional CPS is not working properly but the horizontal resolution is still too coarse for a grid scale process to represent all the precipitation processes. Therefore, we faced difficulty of accurate simulation of precipitation in those resolutions. In this presentation, a method developed in order to address the issue of CPS gray-zone will be shown with some preliminary results. The newly developed CPS has scale aware capability, so it can be used across all horizontal resolutions across the CPS gray-zone.

School of Urban & Environmental Engineering

- **When : 2019.09.19. (Thu) 16:00**
- **Where: Bldg.110 (EB4), Room.N102**
- **Host : Prof. Cha, Dong-Hyun**
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