

## Regional CO<sub>2</sub> Flux Estimates for North America from Inverse Modeling

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In a recently started project, we will use a newly developed transport model (TM5) to estimate sources and sinks of CO<sub>2</sub> on a regional scale over North America. Measurements of CO<sub>2</sub> and its δ<sup>13</sup>C isotope from the CMDL network will be used in combination with a state-of-the-art inversion technique. The improved density of the future measurement network in the United States, combined with the unique "zooming" capabilities of the TM5 global model, will allow us to spatially refine previous estimates and reduce their uncertainty.

The TM5 model will enable us to resolve transport over the North American continent on a 100 × 100 km, and possibly finer, scale (up to ECMWF operational). The two-way nesting capabilities of TM5 (Figure 1) allow computational efficiency while retaining information from remote areas that can have a significant influence. A Kalman filter assimilation technique will be used to find CO<sub>2</sub> fluxes that are optimally consistent with the CMDL measurements.

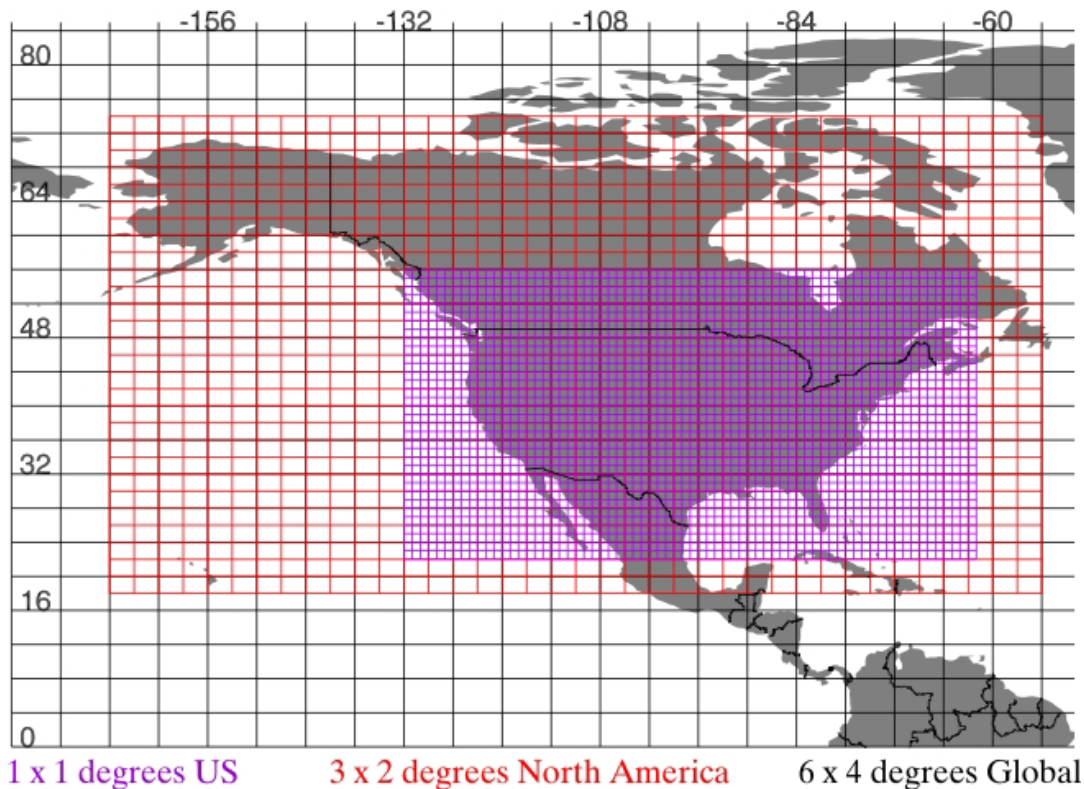


Figure 1. The TM5 global model in this example has a 6 × 4 degree resolution globally, a 3 × 2 degree resolution over North America, and a 1 × 1 degree resolution over the continental United States.