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The role of biomass burning emissions on the atmospheric composition of the Artcic using the global modeling with pyroconvection

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Atmospheric composition of the Arctic is significantly influenced by wildland fire emissions, in particular those occurring in boreal regions. Fire smoke affects chemical and physical properties of the atmosphere at a wide range of spatial and temporal scales, which depend on the lifetime of the emitted species and the transport pathways.
However, the quantification of the influence of fires over the Arctic is still uncertain, due to uncertainties in the amounts emitted, but also on their transport, more specifically their injection height. Several in-situ field campaigns have been conducted in the recent years in order to better characterize pollution in the Arctic (ARCTAS and POLARCAT campaigns in 2008) and boreal fire emission influences on atmospheric composition (BORTAS in 2010). Here, we investigate the influence of fire emissions on budgets of reactive species such as ozone, hydroxyl radical and formic acid over the Arctic region.
Simulations are performed with the LMDZORINCA_v5 global chemistry transport model including a parameterization of pyroconvection as well as regional CO tracers using FINNv1 inventory for emissions and focusing on two high fires periods during 2008 (Mars-April and June-July). We will present an evaluation of the simulations against in situ and satellite observations (CALIOP and MISR for fire injection height, IASI CO and GOME-2 NO_2), with a particular focus on the transport of biomass burning plumes. An evaluation of the importance of injection height in terms of transport pathways and ozone production will also be examined.