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Influence of sea breeze circulation on photooxidants formation over Gdansk Bay on Baltic Sea.

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Gdansk Bay is located in eastern-south part of The Baltic Sea. Due to specific coastline and orographical features, the climatology of this region is characterised by complex local winds. Due to proximity of the Gdynia-Sopot-Gdansk agglomeration, sea breeze circulation has an important influence on the transport of ozone precursors emitted from this area. High pollution episodes occur very often during summertime over Gdansk Bay. Concentrations of ozone and nitrogen oxides, measured by ARMAAG air quality network (www.armaag.gda.pl), have been analysed for severe air pollution events during three-year period (2001-2003).

In order to study the effects of the breeze circulation on air quality in this region the MC2-AQ photochemical model has been used. MC2-AQ is a non-hydrostatic meteorological and on-line air quality model based on the Canadian Mesoscale Compressible Community Model. Modules permitting on-line calculations of chemical transformations, anthropogenic and biogenic emissions, and deposition have been integrated into MC2 and the transport of chemical species is done on the same grid and with the same advection, convection and diffusion schemes as are used for the meteorological fields. The developed model is highly flexible and was adapted to different scales by allowing for self-nesting.

Two 5 - day simulations, for representative photochemical episodes, have been performed in cascade mode with final resolution of 3 km. We will present the interaction between local breeze circulation and the synoptic flow. The analysis of the meteorological parameters and chemical species concentration fields will be completed with the estimation of intensity of transport and re-circulation due to sea breeze over

Gdansk Bay. The comparison of the model results with measurements from surface stations will be also shown.