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# Halogens and their role in polar boundary-layer ozone depletion

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Abstract. During springtime in the polar regions, unique photochemistry converts inert halide salt ions (e.g. Br<sup>-</sup>) into reactive halogen species (e.g. Br atoms and BrO) that deplete ozone in the boundary layer to near zero levels. Since their discovery in the late 1980s, research on ozone depletion events (ODEs) has made great advances; however many key processes remain poorly understood. In this article we review the history, chemistry, dependence on environmental conditions, and impacts of ODEs. This research has shown the central role of bromine photochemistry, but how salts are transported from the ocean and are oxidized to become reactive halogen species in the air is still not fully understood. Halogens other than bromine (chlorine and iodine) are also activated through incompletely understood mechanisms that are probably coupled to bromine chemistry. The main consequence of halogen activation is chemical destruction of ozone, which removes the primary precursor of atmospheric oxidation, and generation of reactive halogen atoms/oxides that become the primary



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■ <u>Final Revised Paper</u> (PDF, 5811 KB) ■ <u>Supplement</u> (2590 KB) ■ <u>Discussion Paper</u> (ACPD)

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