Volcanic products from the Popocatepetl ongoing eruption have been studied to determine the level of activity changes. Hydrogeochemistry of springs and chemistry of ash-leachates have been used as diagnostic and pronostic tools since the beginning of the current episode in 1994. Physico-chemical parameters including main ions, boron, fluoride and silica were regularly determined in 7 springs along 16 years. Boron, chloride, sulfate, and dissolved CO$_2$ were identified as the chemical species more directly linked with the volcanic activity, reflecting dissolution of magmatic gases in water. Percentage Residual Acidity (PRA) was also related to activity increases in some periods. Chemistry of aqueous leachates of tephra has been used as an additional geochemical monitoring tool. Application of multivariate statistical analysis to the sulfate, chloride, and fluoride percentages showed 4 groups of concentrations with significant correlations with the eruption characteristics. A shift towards the fluoride corner in a triangular diagram was observed previous to dome emplacements, mainly in the year 2000, when the highest dome growth rates were recorded. Although S/Cl ratio has been used to monitor the activity at other volcanoes, its application to Popocatepetl must be carefully assessed, since high sulfur in leachates may be produced by SO$_2$ adsorption or from dissolution of altered material, the later unrelated to the intensity of the volcanic activity. Intrusion of new lava domes was reflected on high fluoride percentage and low S isotopic values. Use of various monitoring tools is essential in high risk volcanoes like Popocatepetl.