Sandro Vattioni - Atmospheric Chemist & Climate Scientist

Chemistry of solid–gas interfaces and chemistry–climate interactions

Education

03/2020 - 01/2024	**Doctor of Science** Thesis title: Chemical and climatic impacts of solid particles for stratospheric solar climate intervention	**ETH Zürich**
10/2018 - 12/2022	**Teaching diploma in Geography** Teaching sustainable development topics at gymnasium level	**ETH Zürich**
09/2015 - 06/2018	**MSc in Atmospheric and Climate Sciences** Focus: atmospheric chemistry	**ETH Zürich**
	Master thesis Modelling and evaluation of aerosol injection scenarios with Prof. David Keith	**Harvard University**
	Exchange semester Focus: air pollution control	**HKUST, Hong Kong**
09/2012 - 09/2015	**BSc in Earth Sciences**	**ETH Zürich**

Work Experience

06/2025 - present	**Post Doctoral Researcher Researcher** Development of the next generation of the aerosol-chemistry-climate model SOCOL	**PMOD/WRC**
03/2020 - present	**Post Doctoral Researcher Researcher** - **Management of complex international research projects** with leading experts from different fields and institutions - **Successful fundraising:** Two grants by the "Simons Foundation" based in New York (2×1.2M USD, ,), ETH Research Grant (228k CHF), Harvard SGRP Fellowship (18k CHF,) - **Supervision of students:** numerous master theses, bachelor theses, semester projects and research interns. Examples: , - **Experimental work on surface chemistry** using X-ray Photoelectron Spectroscopy and Elastic Recoil Detection Analysis - **Implementation of surface chemistry parameterisations** on solid aerosols into a chemistry-climate model - **Quantification and assessment of surface chemistry** on solid aerosols and their effect on the stratospheric ozone layer - **Co-lecturer for graduate-level courses** "Environmental Systems", "Atmospheric Chemistry", "Stratospheric Chemistry"	**ETH Zurich**

03/2024 - 07/2024	**Guest researcher**	**NCAR**
	Led implementation of **surface chemistry parameterisations** into a climate model with Dr. Simone Tilmes at the National Center for Atmospheric Research (NCAR)	
07/2022 - 10/2022	**Guest researcher**	**Harvard University**
	Harvard Solar Geoengineering Research Program Fellowship. Successful collaboration with Prof. Frank Keutsch at the Department of Chemistry	
09/2020 - 12/2023	**Guest researcher**	**Paul Scherrer Institute**
	Ambient Pressure X-Ray Photoelectron Spectroscopy experiments at the Synchrotron of the Swiss Light Source and Elastic Recoil Detection Analysis in collaboration with Prof. Markus Ammann	
	Side jobs	
2019 and 2024	Geography teacher, Gymnasium Liestal and KS Musegg, Lucerne	
10/2013 - 01/2017	House officer in a student home with 100 inhabitants	
10/2015 - 01/2017	Teaching assistant for lecture "Dynamic Earth" and museum guide at the museum focusTerra, ETH Zurich	

Military Service

06/2011 - 08/2012	**Weather Officer (first lieutenant), Swiss Armed Forces** Formal leadership training, operational weather ballon soundings, and strategic decision-making
2012 - 2018	**Company Commander (temporary assignment)** Executive responsibility at company level (120 people), including coordination and operational planning, responsibility for personnel

Languages

German: mother tongue; **English**: fluent; **French**: good working knowledge

Programming

Fortran, Python, NCL, LaTeX, IgorPro

Extracurricular Activities

06/2025 - current	**Co-author** of the 2026 Ozone Assessment Report from the World Meteorological Organisation
06/2025 - current	**Expert Contributor** to SRM360.org, a knowledge hub on solar radiation modification
09/2014 - 06/2016	**Member of the board** in the Earth Science Student Association of ETH Zurich, erfa
12/2013 - 01/2018	**Member of the board and president** of the Student Officers Club of ETH and University of Zurich, Of@CampusZH
01/2013 - 01/2017	**Member of the board of trustees**, Foundation for student housing, SwissRe Foundation

Awards and Media Coverage

Pineapple Science Award: China's Ig Nobel Prize (2025)

Tagesanzeiger:	"Raketenstarts gefährden die Erholung der lebenswichtigen Ozonschicht" (June 2025)
ETH Zukunftsblog:	"The new space age could thin the ozone layer" (July 2025)
SwissInfo.ch:	Perspective: "Is solar radiation management worth the risk for climate-vulnerable countries?" (May 2025)
SRM360.org:	Perspective: "Alternative particles could reduce the side effects of SAI" (March 2025)
Tagesanzeiger:	"Mit Diamantenstaub die Erde kühlen?" (October 2024)
ETH News:	"Geoengineering will not solve the problem of climate change" (October 2024)
Science Magazine:	"Are diamonds Earth's best friend? Gem dust could cool the planet" (October 2024)

Outreach

Invited talks:	Gordon Research Conference on Geoengineering (2024); NCAR and NOAA seminars (2024); Degrees Global Forum (2025)
Public lectures:	ETH Treffpunkt Science City (2025), Vollenweider Lecture (2025)

Selected Publications

On surface chemistry:

- **Vattioni et al., accepted, Environmental Science: Atmospheres**, X-ray Photoelectron Spectroscopy and Elastic Recoil Detection Analysis for quantifying HNO_3 and HCl uptake on calcite surfaces. ***Manuscript can be shared on request.***
- **Vattioni et al., 2023, Geophysical Research Letters**: Chemical impact of stratospheric alumina injection for solar radiation modification and related uncertainties.

On model development and chemistry-climate modelling:

- **Vattioni et al., 2025, Nature Communications Earth & Environment**, Injecting solid particles into the stratosphere could mitigate global warming but currently entails great uncertainties.
- **Vattioni et al., 2024, Geoscientific Model Development** A fully coupled solid-particle microphysics scheme for stratospheric aerosol injections within the aerosol–chemistry–climate model SOCOL-AERv2.
- **Vattioni et al., 2024, Geophysical Research Letters**, Microphysical interactions determine the effectiveness of solar radiation modification via stratospheric solid particle injection.