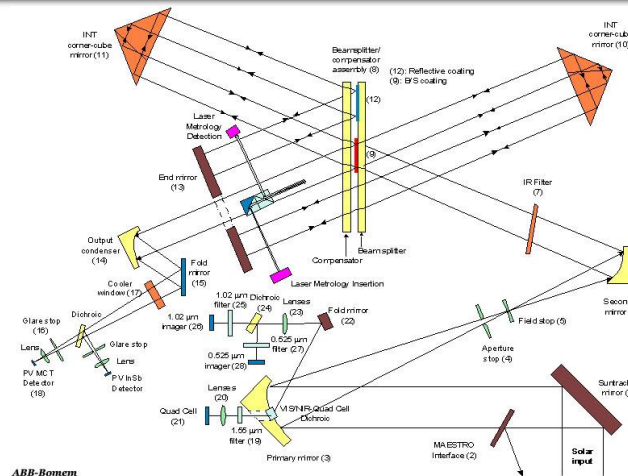


## Introduction

- We are studying sulfur dioxide (SO<sub>2</sub>) in the Earth's Atmosphere
- SO<sub>2</sub> is one of the primary gases associated with atmospheric aerosol formation, which contributes to global cooling
- The research is based on data from the Atmospheric Chemistry Experiment (ACE) satellite, also known as SCISAT.

## Fourier Transform Spectrometer (FTS)

- ACE studies SO<sub>2</sub> and other atmospheric gases using its FTS to record their spectra.
- The FTS sensor is a Michelson interferometer →  
(source: <http://www.ace.uwaterloo.ca/>)



## Findings

- ACE data are processed with MATLAB to determine things such as the normal background SO<sub>2</sub> levels and to find key SO<sub>2</sub> sources like volcanic plumes
- The image below is the SO<sub>2</sub> plume of the Raikoke volcano in Russia which erupted in June 2019

**SCISAT**  
This small Canadian satellite monitors ozone in the stratosphere and helps scientists improve their understanding of ozone depletion, with a special emphasis on the changes occurring over Canada and in the Arctic.

**2003 LAUNCH**  
The satellite was launched on August 12, 2003.

**74° INCLINATION**  
In order to collect data over a large part of the Canadian Arctic, SCISAT orbits the Earth at an angle of 74° in relation to the equator.

**2 INSTRUMENTS**  
Equipped with two optical instruments, SCISAT measures the distribution of gas species in the Earth's atmosphere.

**6016 SOLAR OCCULTATIONS PER YEAR ON AVERAGE**  
SCISAT experiences many sunrises and sunsets in a day. At those times, it takes various measurements using the sun's rays passing through the Earth's atmosphere. This technique is called solar occultation.

**30 PUBLICATIONS PER YEAR**  
SCISAT data is found in over 30 scientific journal articles per year.

**100 INSTITUTIONS**  
Over 100 institutions worldwide have been involved in publications related to SCISAT.

**650 km ALTITUDE**  
SCISAT orbits at an altitude of 650 km.

**15 ORBITS PER DAY**  
SCISAT completes an orbit every 96 minutes or so, meaning that it circles the Earth about 15 times per day.

**66 TRACE GASES**  
SCISAT measures more gases than any other space-based instrument in the world.

Canada

SO<sub>2</sub> VMR, PPT, Raikoke Eruption (22 Jun 2019, 48.1N) Sep 2019 Data

