

Thank you for your interest in this program – I very much hope this will be helpful to you. Please find here a few important notes and also installation instructions.

IT IS VERY IMPORTANT THAT YOU READ THIS FULLY BEFORE PROCEEDING.

IMPORTANT NOTES:

- 1 Ocean Optics has recently upgraded the USB2000 to the USB4000 and USB2000+. I will be looking into updating the code accordingly and if I am able to do so I will also post the updated program on this website in due course. The code will not work with any of the latter instruments at present.
- 2 I have not tested the program on the Microsoft Vista operating system (we are not that sophisticated at Sheffield and haven't got this yet!) so I have no idea if volcanoSO2.exe will work on this. Good luck to the first person who tries!
- 3 In the paper I quote a Garmin USB-RS232 converter part number. I have subsequently tested this, and would recommend against buying it, as it is overpriced and does not perform well. I use a really inexpensive device from Maplin electronics in the UK (£20), which I can recommend: part number ZP43W, from www.maplin.co.uk.
- 4 When the program runs, make sure any on-access scan facility in your anti-virus software is switched off, as this slows the program down. In addition, make sure no other devices are connected to your computer while the program is running, and that your wireless modem is switched off, as this can create problems: e.g., if windows decides to auto-update halfway through the program running!
- 5 The aspect ratio of the program window is set according to that of the screen of the computer volcanoSO2.exe was written on e.g., width 245mm height 186 mm. Where computers of significantly different screen aspect ratios are used it may be necessary to scroll down the screen for execution of the latter steps of Measurement.vi and Calibration.vi.
- 6 If a crash occurs while the program is running, this may render some of the controls in volcanoSO2.exe inoperable, possibly necessitating re-installation of the program. In this case first uninstall the program using “Add or remove programs” in the control panel, then delete the folder C:\volcSO2, restart the computer, then finally follow the installation instructions detailed below.
- 7 In the cases of a few spectrometers, the retrieved concentrations for SO₂ cells of known column amounts are found to be too low (this has applied to 2 USB2000s of the 8 I have worked with, where apparent concentrations are $\approx 60\%$ of the real values). This error is systematic and its origin has yet to be determined, although it is related to the spectrometer and not the code, as DOASIS also encounters the same problem. In view of this it is **STRONGLY RECOMMENDED** that volcanoSO2.exe is run once for each USB2000 with a SO₂ cell of known concentration to determine whether this effect applies in the case of the device in question. This problem can be diagnosed, if, when the USB2000 is properly calibrated with the program subcomponent Calibration.vi, the code returns cell SO₂ concentration outside the $\approx \pm 15\%$ random error tolerance in the retrieval. Where this occurs, an appropriate scaling factor (e.g., real cell concentration/measured value) will need to be determined, then all measured

fluxes multiplied by this value to output the correct fluxes. Note that this factor appears to remain constant; e.g., such a cell test need only be performed once for each USB2000.

8 I have deliberately made this code available free of charge on a non-commercial basis. Whilst I hope that this will expedite you being able to measure SO₂ fluxes at low cost, this also means that I regret that I will not be in a position to answer technical support queries on the code or its associated hardware. I have tried to anticipate these queries in the JVGR article associated with volcanoSO2.exe: <http://dx.doi.org/10.1016/j.jvolgeores.2007.02.001>. I spent about six months testing this program to try and iron out bugs, but this doesn't mean there aren't some still in there that I have not picked up on. If you spot any please do feel free to let me know.

9 If you use this code for your science please do cite the accompanying JVGR article, which provides full instructions on the use of the code:

McGonigle, A.J.S., 2007, Measurement of volcanic SO₂ fluxes with differential optical absorption spectroscopy, *J. Volcanol. Geotherm. Res.*, 162, 111-122, doi: 10.1016/j.jvolgeores.2007.02.001.

INSTALLATION INSTRUCTIONS:

1 Click on the “download volcanoSO2.exe” link on the page from which this document was downloaded: e.g., www.shef.ac.uk/geography/staff/mcgonigle_andrew/volcanoso2.html.

2 A new window will open, and a security message may appear at the top of this: “To help protect your security...” Right click on this and select “Download file”. You will then be prompted to open or save the file volcSO2.zip – save this to the desktop.

3 Now create a folder C:\volcSO2, right click on volcSO2.zip and select Extract all, follow the instruction in the folders extraction wizard, selecting C:\volcSO2 as the folder to which the files will be extracted.

4 Now go to: C:\volcSO2\installer and double left click on install.msi. A windows security warning may come up, ignore this and click “run” at which point the volcanoSO2 setup wizard will commence. Follow the steps though this wizard, which will prompt you for the name of the folder to which the application will be installed, at which time you should browse and select C:\volcSO2\.

5 From now on you should just follow the instructions on the operation of the code as detailed in the accompanying JVGR paper: <http://dx.doi.org/10.1016/j.jvolgeores.2007.02.001>

6 When you open the code for the first time, you may be requested to identify the location of OOIDrv32.dll. This is found at: C:\volcSO2\support\ OOIDrv32.dll.