

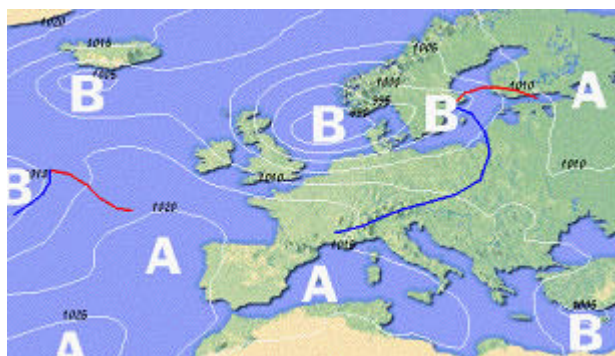
Atmospheric pressure



SOCRATES MINERVA
Programme
99843-CP-1-2002-1-PL

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Change of air pressure as function of height will be investigated using a barometer interfaced to a graphing calculator. Data will be collected while going upstairs in a three floor building.



Contents:

- Apparatus setup
- Data collection
- Data analysis (TI89)

Apparatus set up

The following items are needed for performing the experiment:

- Graphing calculator supporting DataMate software
- Barometer
- LabPro or CBL2 interface
- Connecting cables

Data Collection

Before starting the experiment be sure to have loaded the program DataMate into the graphing calculator, in case you have not you can load it from the CBL2.

- Connect the CBL2 to the graphing calculator and to the barometer.
- Start the program DataMate.
- In the main menu press 1:SETUP.
- Select CH1 and press ENTER
- Press the key corresponding to the sensor – BAROMETER-
- Press 1:OK to go back to the main menu.
- Press 1:SETUP
- Set the cursor on MODE and press ENTER
- Press 2:TIME GRAPH
- Press 2:CHANGE TIME SETTING

Here you can select the sampling interval and the number of samples.

We suggest that you choose an interval of 6s and a number of 5 samples.

- Press 1:OK twice to go back to main menu.
- Press 1:START and begin to go upstairs, continue until you reach the third floor and then stop and wait until data collection is completed.



Data Analysis

First of all explore the plot on the screen by moving the cursor (pressure is measured in mmHg and time in seconds).

Note that air pressure becomes smaller as one goes upstairs.

Next step will be the analysis of pressure change during the whole trip.

1. Calculate the difference of pressure from start to end point

Moving the cursor to the initial value (starting position) we read for pressure:

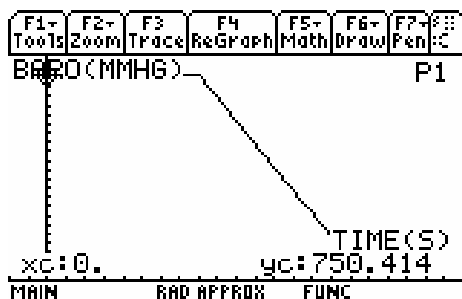
$$P1 = 750.4 \text{ mmHg}$$

Whereas at the end of trip we read:

$$P2 = 749.4 \text{ mmHg.}$$

The change of pressure is therefore

$$\Delta P = 750.4 - 749.4 = 1.0 \text{ mmHg}$$



2. By knowing that a change of 1mmHg corresponds to a variation in height of 10.5 m, calculate the height of three floors

$$H = (\Delta P \times 10.5) = 10.5 \text{ m}$$

This is a reasonable value for the height of three floors.