NELSAM update: work in Tautona mine

December 2, 2005

The developments since the last update (October 31, 2005) and the plan for the near two months are below. Previous progress reports appear on the web page (earthquakes.ou.edu).

Long boreholes drilling. The first borehole DAFAULT1 was drilled at angle of 19° downward across the Pretorius fault (see map). The hole was successfully completed to the planned depth of 60 m, it was continuously cored and now it is cased with steel casing. The drilling took a long time for two main reasons as explained in previous report. [First, the drilling cubby and its near-by haulage suffer from multiple cases of fall-of-ground including one injury. These events required installation of additional support in the cubby. Each support installation may take more than a week for the design, installation, and safety approval by the mine professionals. Second, drilling itself progressed very slow, some days only a meter per shift. Originally, Boart-Longyear claimed that once started, they can drill more than 10 m per shift. The slow rate was explained by insufficient pressure due to weak pump, difficulties to drill with water (and the addition of drilling chemical that did not help), stressed rocks and/or fractures rocks.]

Eventually, the drilling rig and its power supply were fixed by Boart-Longyear and they restarted to drill full power. The hole is now completed and cased. Drilling of DAFAULT2 had started and today (Dec.2) it has advanced to 4 m with the protective casing installed. Drilling will be resumed in two shifts per day on Dec 4. If the rate of the end of DAFULT1 will be maintained, it will be finished by Dec. 9. DAFAULT2 is collinear with DAFULT1 and together they will host 120 m long displacement meter.

The next hole to be drilled will be either DAFGAS or DASBIO, depending on the progress in DAFULT2. If the later is finished and logged **before** Dec. 12 (see camera condition below), we will continue in drilling DAFGAS, hoping to finish before the holidays break of Boart-Longyear (Dec. 22 to Jan. 2). The drilling of DAFBIO will start in Jan. 3, when it can be continuously monitored by the Bio-teams of Princeton and U of Free State.

Borehole camera logging. From the previous report: [We reported on our previous success to log two short vertical holes (# 10 and # 13), and the 418 m in the inclined borehole LIC118. (which is drilled by the Geology Department of TauTona mine at site #5). We recently attempted to log the third vertical hole, # 9, to depth of 16.5 m by combined efforts of the people of ISSI, University of Free State and the Rock Engineering team of TauTona mine. Unfortunately, the camera cart was placed in the wrong place by one of the mine drivers, was flooded, and is now under testing at the surface.]

The camera system was shipped to Blomfontein where it was thoroughly checked, fixed and tested after the damage. Final testing will be conducted on Monday, Dec. 5, and then will be shipped to Tautona mine. We hope that it will functional again and used by the team of U of Free State to log the available holes.

Installation of accelerometers/EM/thermisters.

Currently, we have at 120 level (see attached map) sites #10 and #13 that are completed including the installation of two 3-component accelerometer systems in each one (USGS). Sites #9, #6, and #6A were drilled to 10 m and the accelerometers will be installed in the next two weeks.

In the planned NELSAM meeting in SF-AGU (Lunch on Wed. Dec. 7), we will discuss some needed changes in the layout of the ACC system.

NELSAM in AGU:

Monday Morning: 0800-12:00 ED11E-1126 MCC Level 2 Chasing earthquakes at focal depth: Personal perspective from 3.6 km depth, Y Barak, I Reches, *Z Reches POSTER

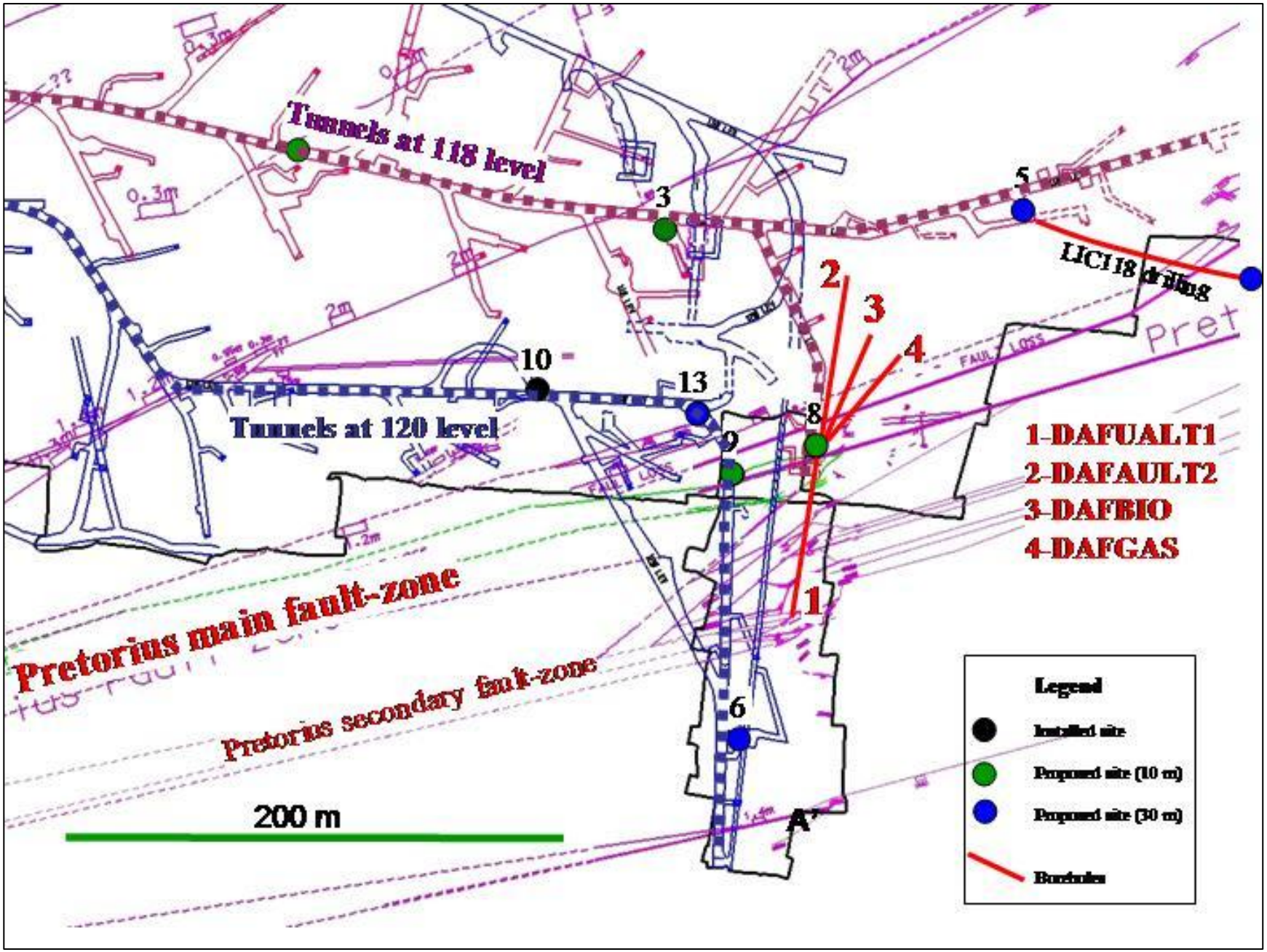
Monday 13:30-14:00 reporting meeting after the Seismology and Tectonophysics Luncheon in the Marriott Hotel, Golden Gate rooms C1~C3. Most of us will be there anyway, all are invited.

Wednesday Morning 0845 S31B-04 MCC 3020 The Rupture Zone of the M=2.2 Earthquake that Reactivated the Ancient Pretorius Fault in TauTona Mine, South Africa. *V Heesakkers, S K Murphy, G van Aswegen, R Domoney, S Addams, T Dewers, M Zechmeister, Z Reches

Wednesday Morning 0900 S31B-05 MCC 3020 Sintered cataclasite of the Archaean Pretorius fault zone, TauTona mine, South Africa *M S Zechmeister, V Heesakkers, K Moore, C Campher, Z Reches

Wednesday Lunch, NELSAM committee meeting 12:00-13:00, at the AGU booth, in the exhibitor's area, Level 1.

Thursday Afternoon 1340 T43D-01 MCC 3024 Drilling Across Active Faults in Deep Mines in South Africa for Monitoring Earthquake Processes in the Near-Field *Z Reches, T H Jordan, M J Johnston, M Zoback INVITED


Tunnels at 118 level
Tunnels at 120 level
Pretorius main fault-zone
Pretorius secondary fault-zone
LIC118 drilling
1-DAFUALT1
2-DAFAULT2
3-DAFBIO
4-DAFGAS
Legend
Installed site
Proposed site (10 m)
Proposed site (30 m)
Boreholes
200 m
A'
1
2
3
4
5
6
8
9
10
13