Large Scale Unconventional Geothermal Development in an Unconventional Site in Australia

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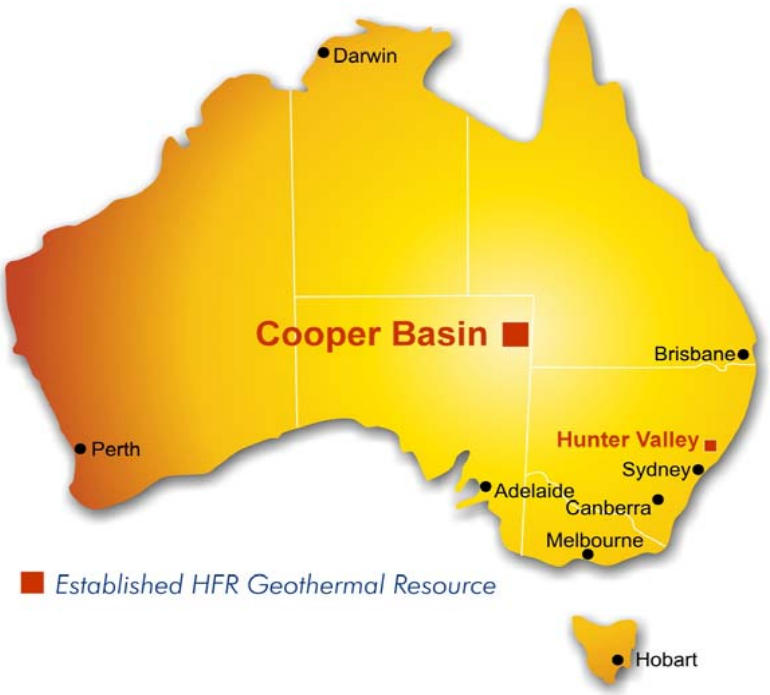
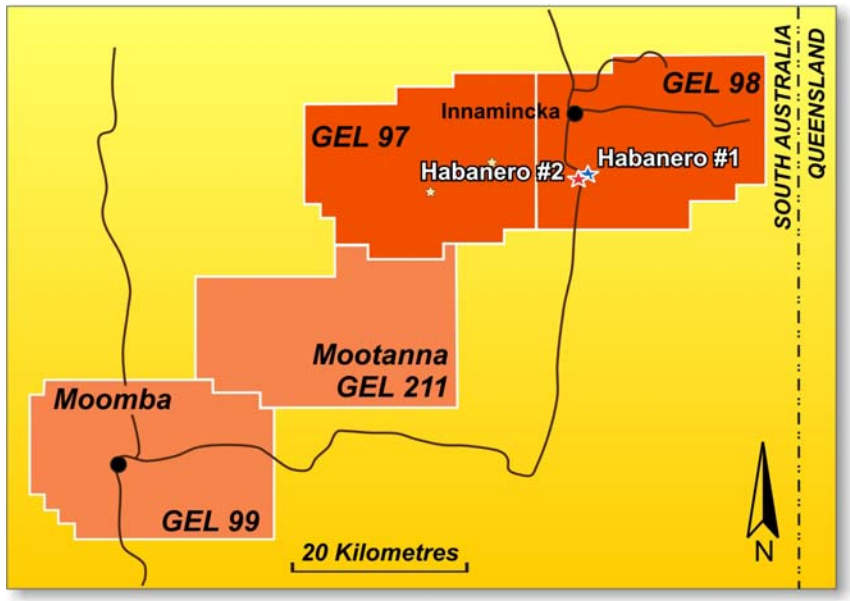
Remote location

Cooper Basin geothermal resource. One of the best sites in world for Hot Fractured Rock (HFR) geothermal electricity generation - potential for 1000's MW generating capacity.





Total licence area = 2,000km^2

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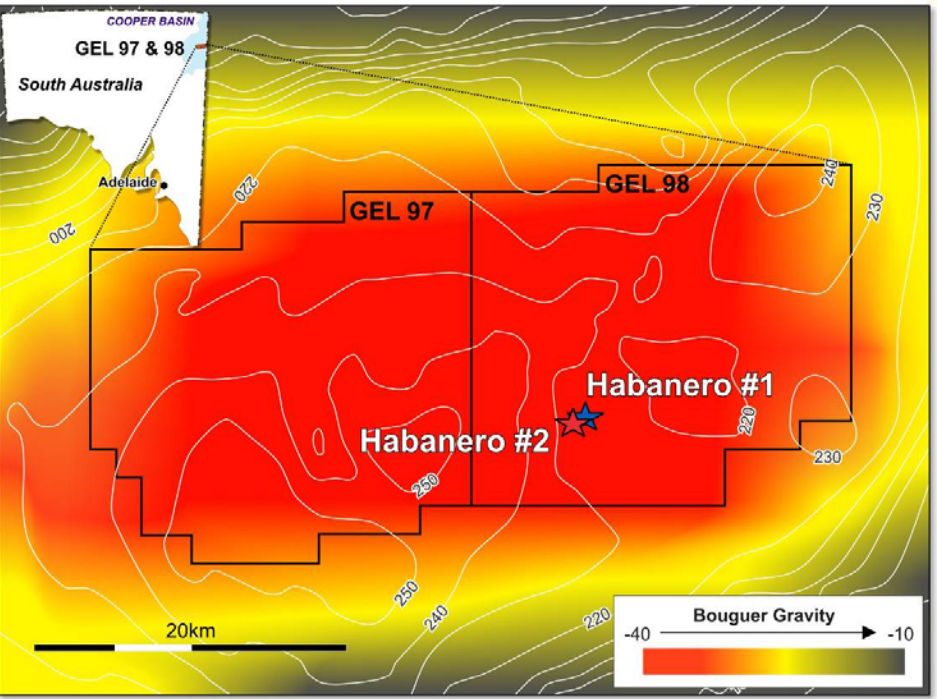
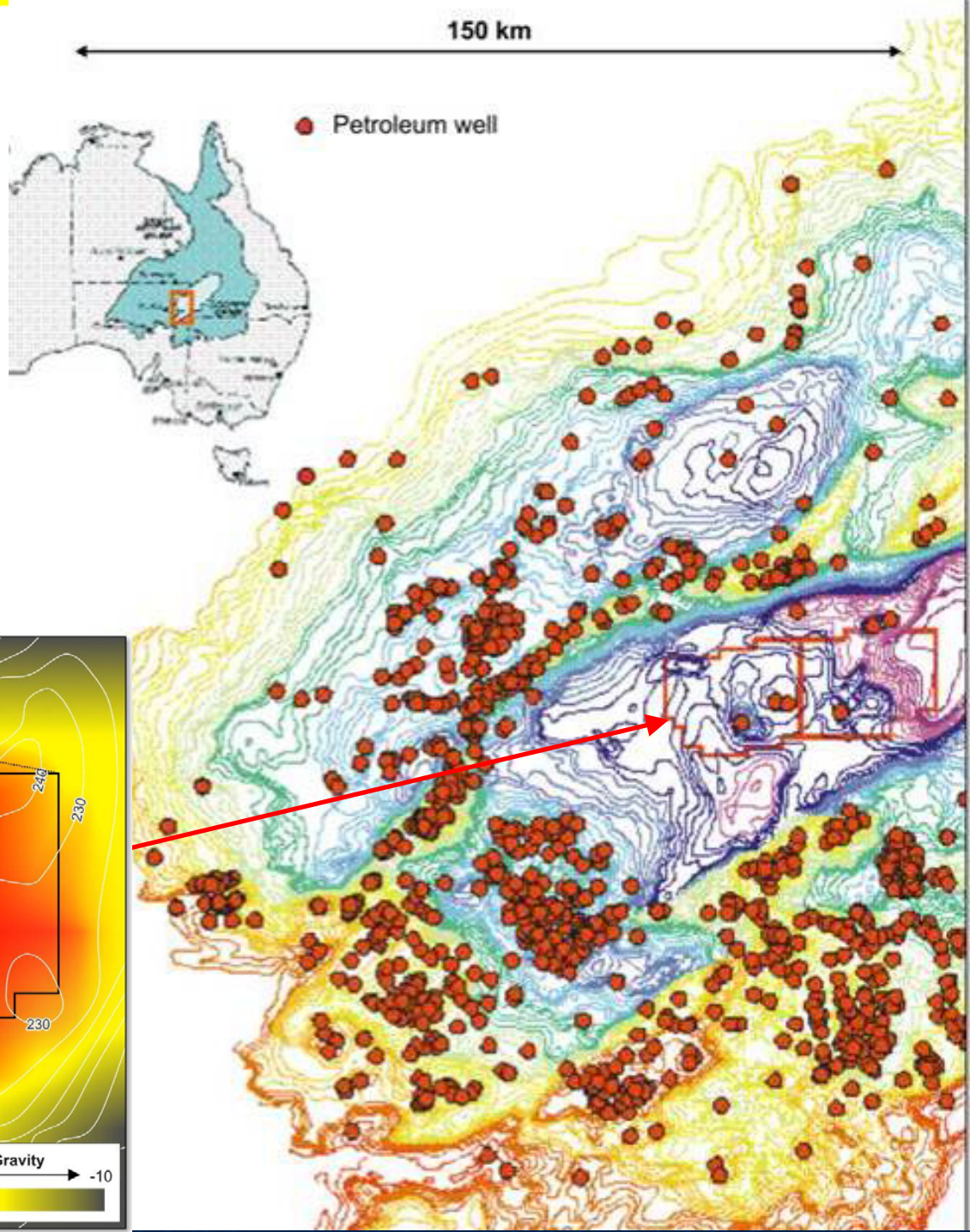
Located beneath a mature oil and gas field

(largest onshore in Australia)

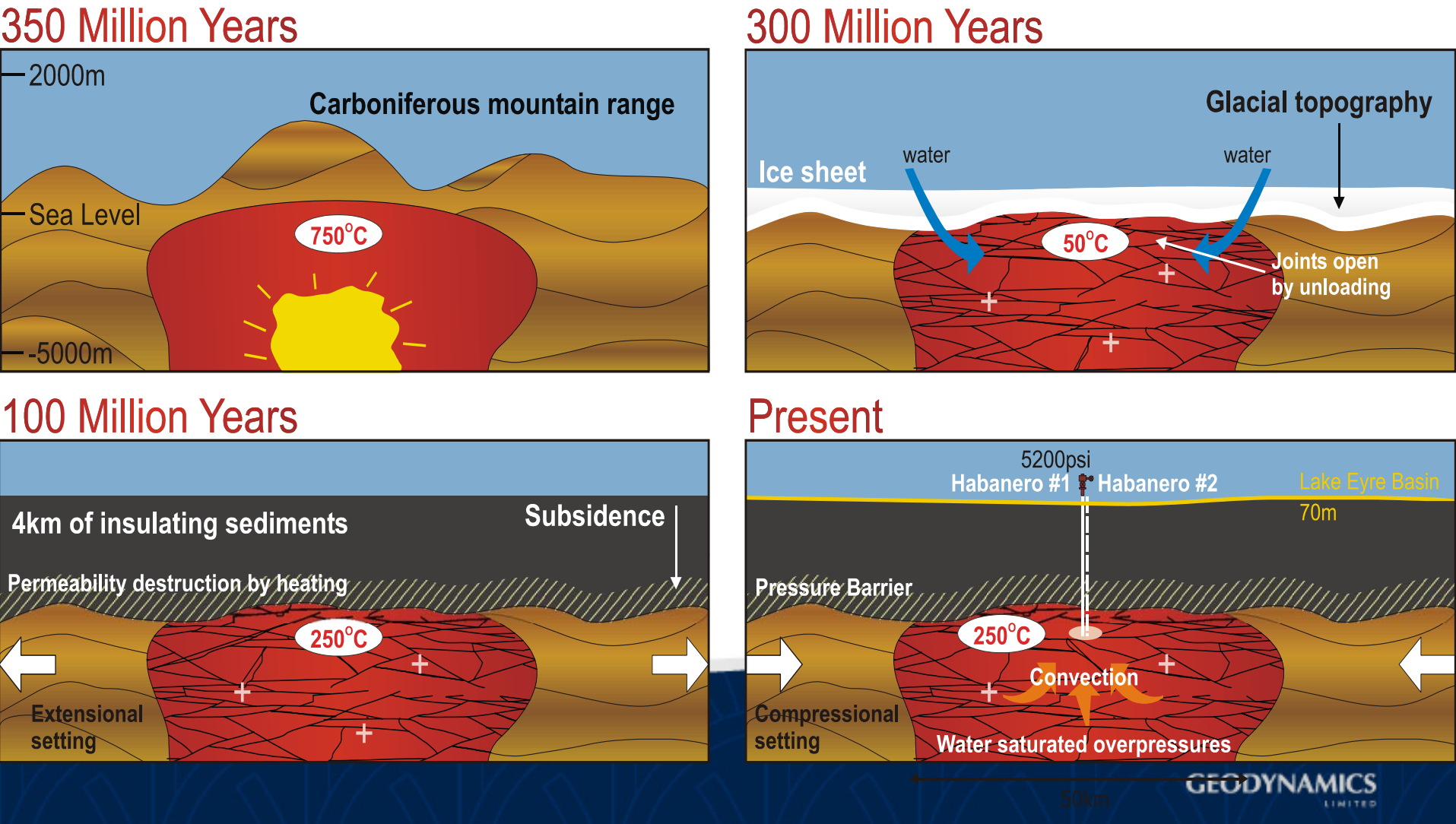




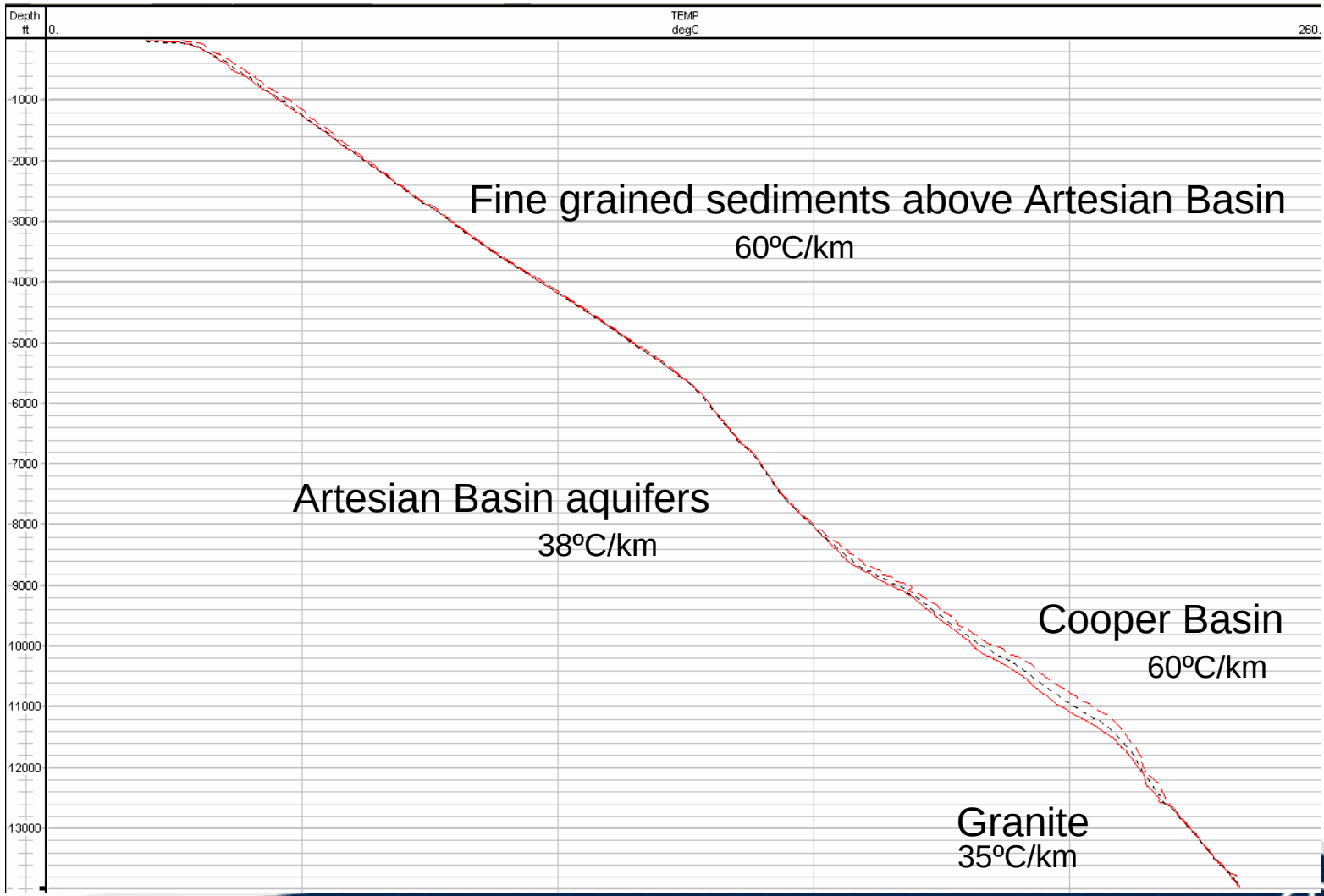
GEOLOGICAL SETTING

- Radiogenic granite (5-10 µwatts/m^3)
- At least 1000 km^2 , at least 10 km thick
- Buried 3.5 - 4 km below surface, mainly insulating sediments
- At that depth for 100 million years
- Temperature at top of granite >220°C
- Crustal shortening stress field (S_3 vertical)
- Recent increases in pore pressure trapped below impermeable cap
- Sub-horizontal natural fractures highly overpressured (5,000 psi)

Geological history –
overpressure formation



Temperature Profile in Habanero-1



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Typical granite jointing

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Unloading joints

Granite exposure in Antarctica

(300m cliff height)

Habanero 2 during drilling in 2004 with Habanero 1 behind (500m), Habanero 3 to be drilled August – October 2007 (550m)

First Steam Production from Habanero 2; November 2004

Flow Test Habanero 2, May 2005

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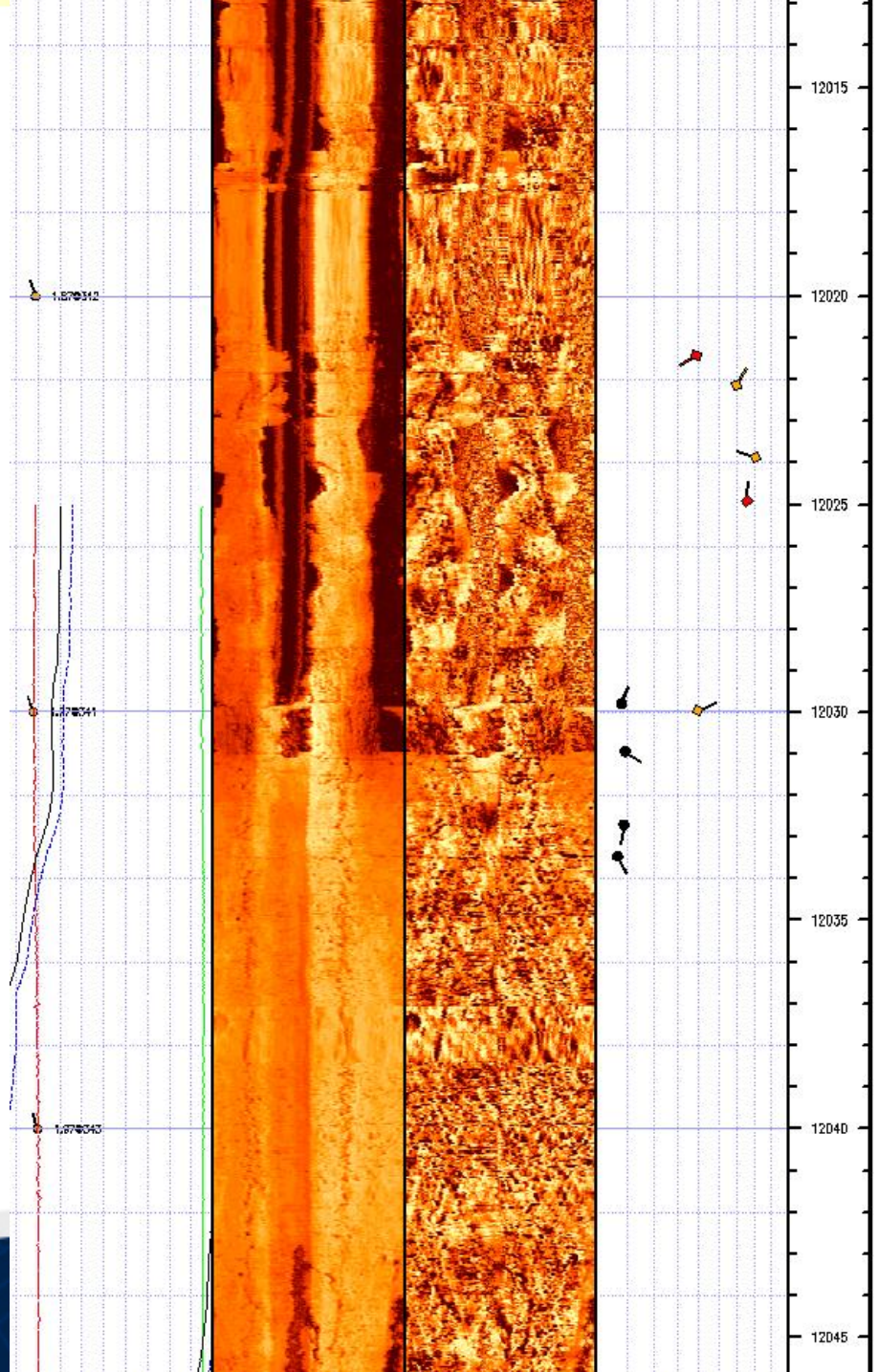
Snub drilling setup – May 2006



Habanero 1
Top of granite

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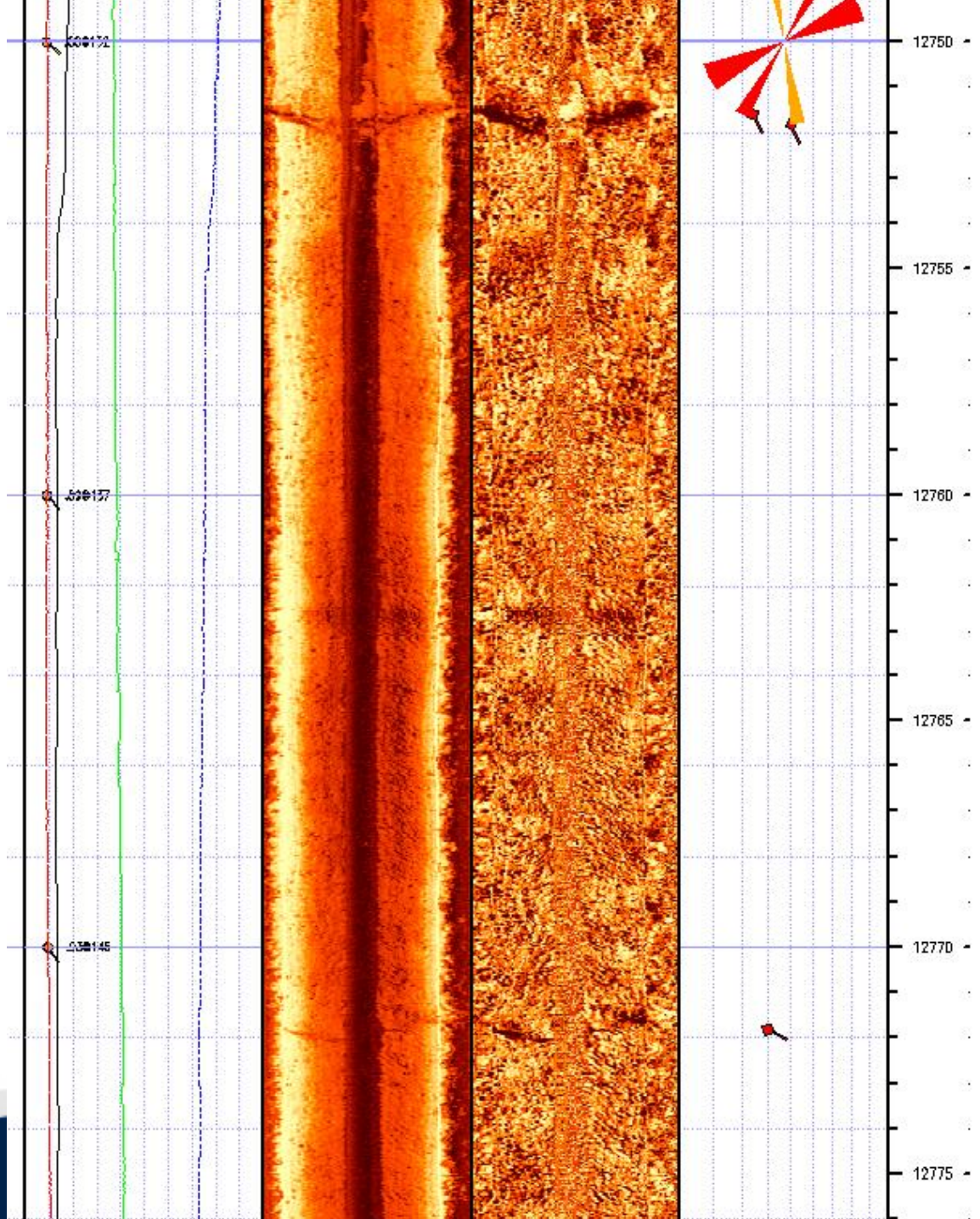

Visible fractures rare

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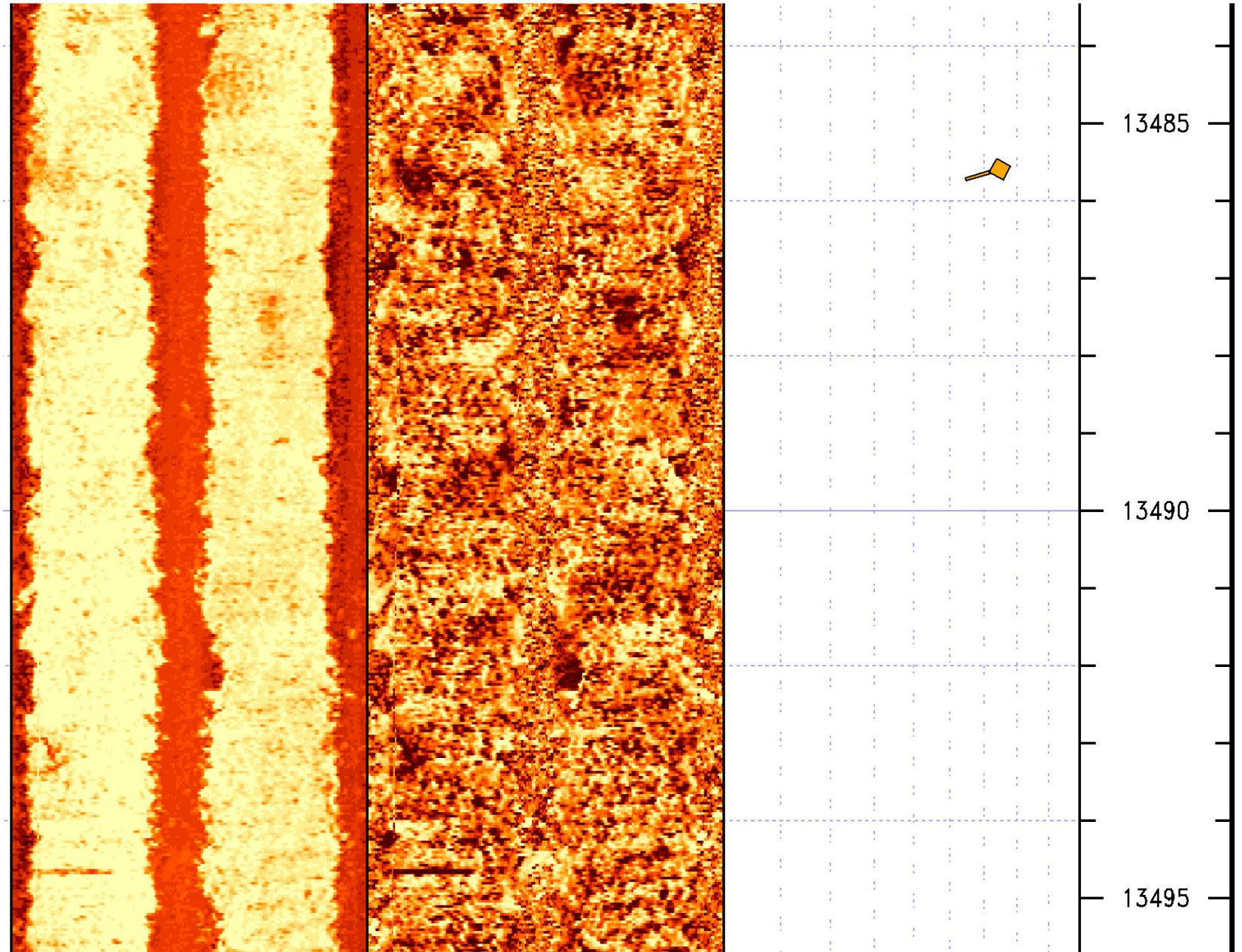
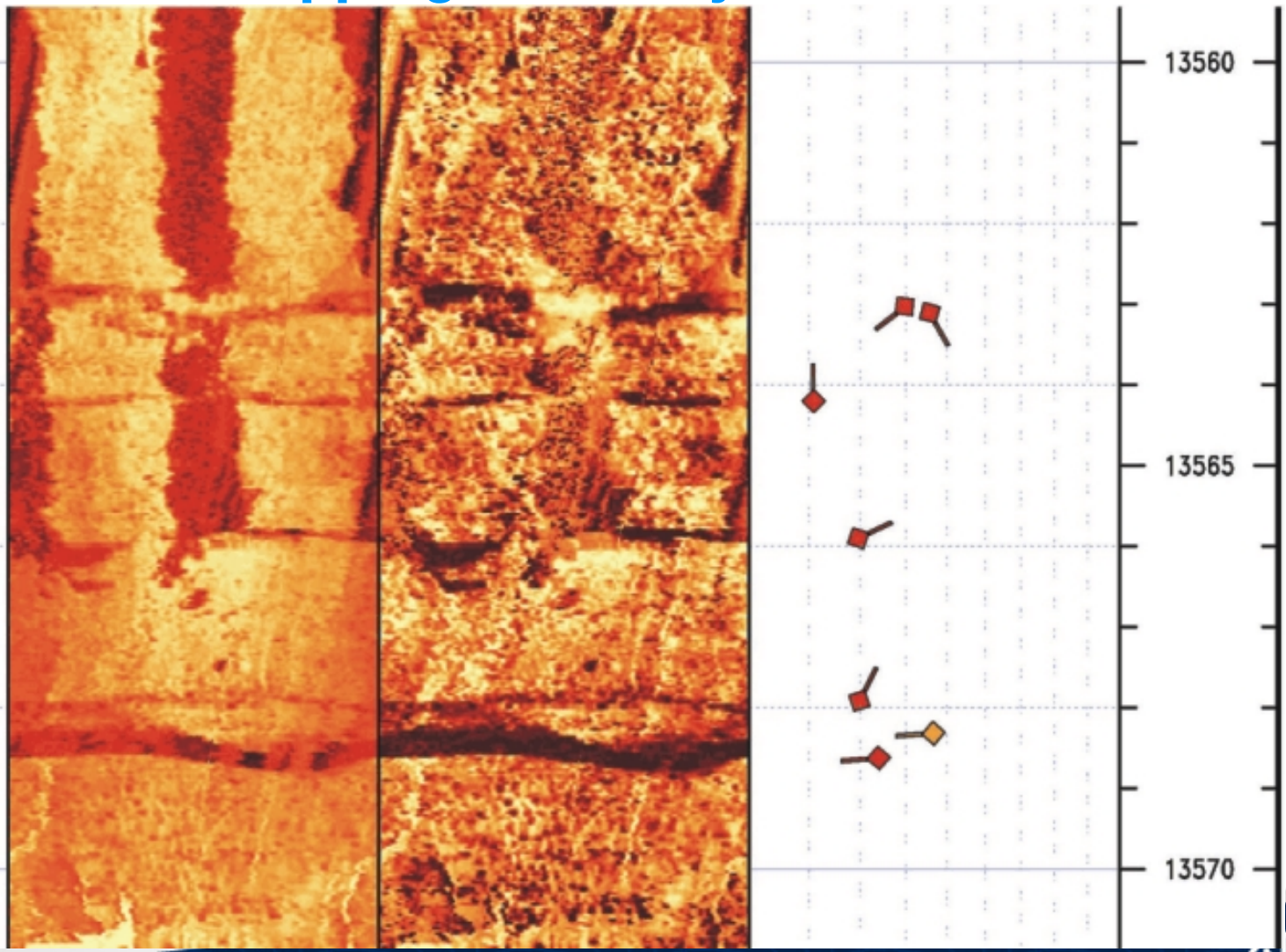
Typical granite section with few imaged fractures and well developed borehole breakout



Major fracture at 4,135m in 8 ½ inch section of Habanero 1 dipping shallowly to the W or SW



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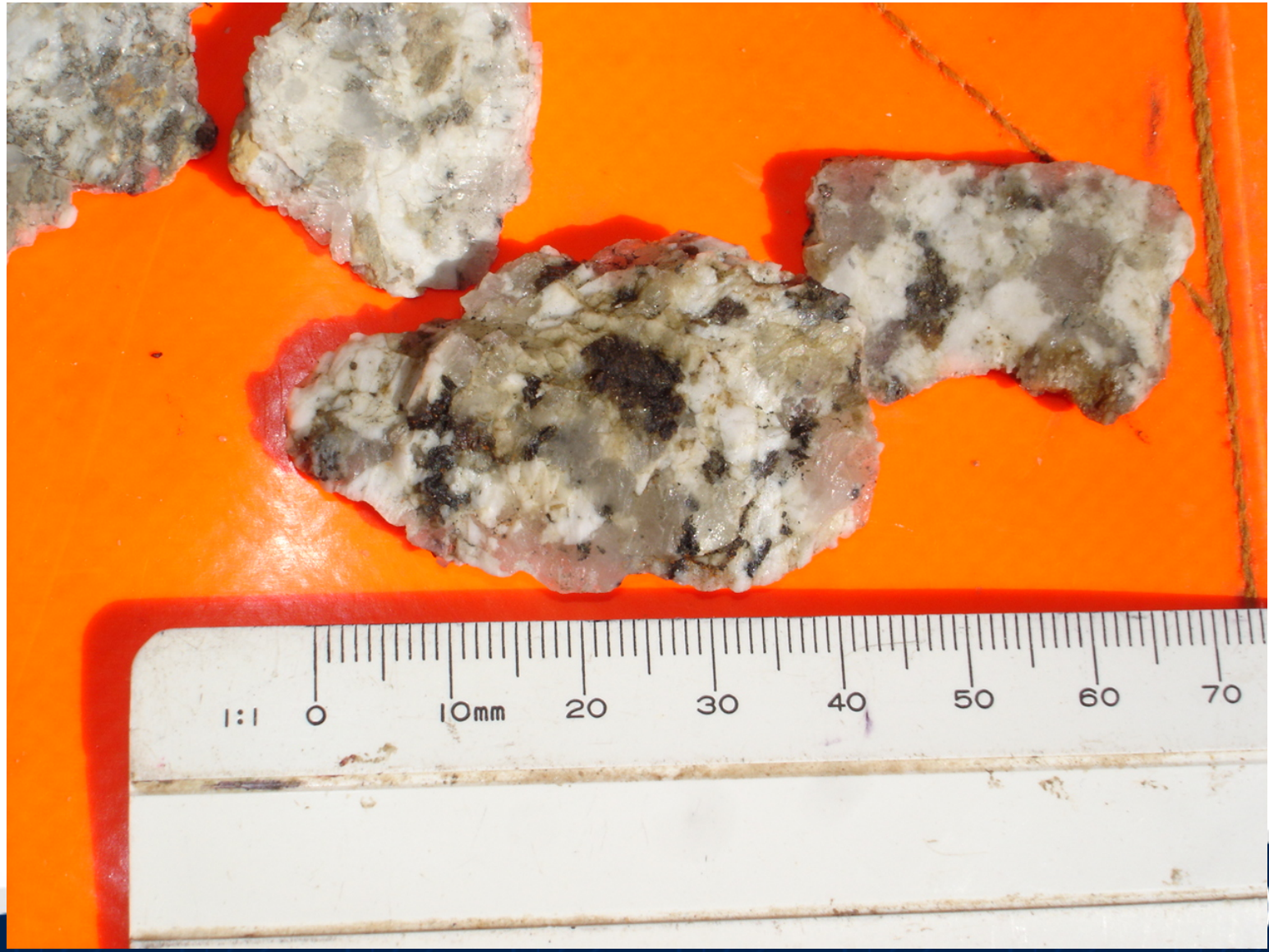
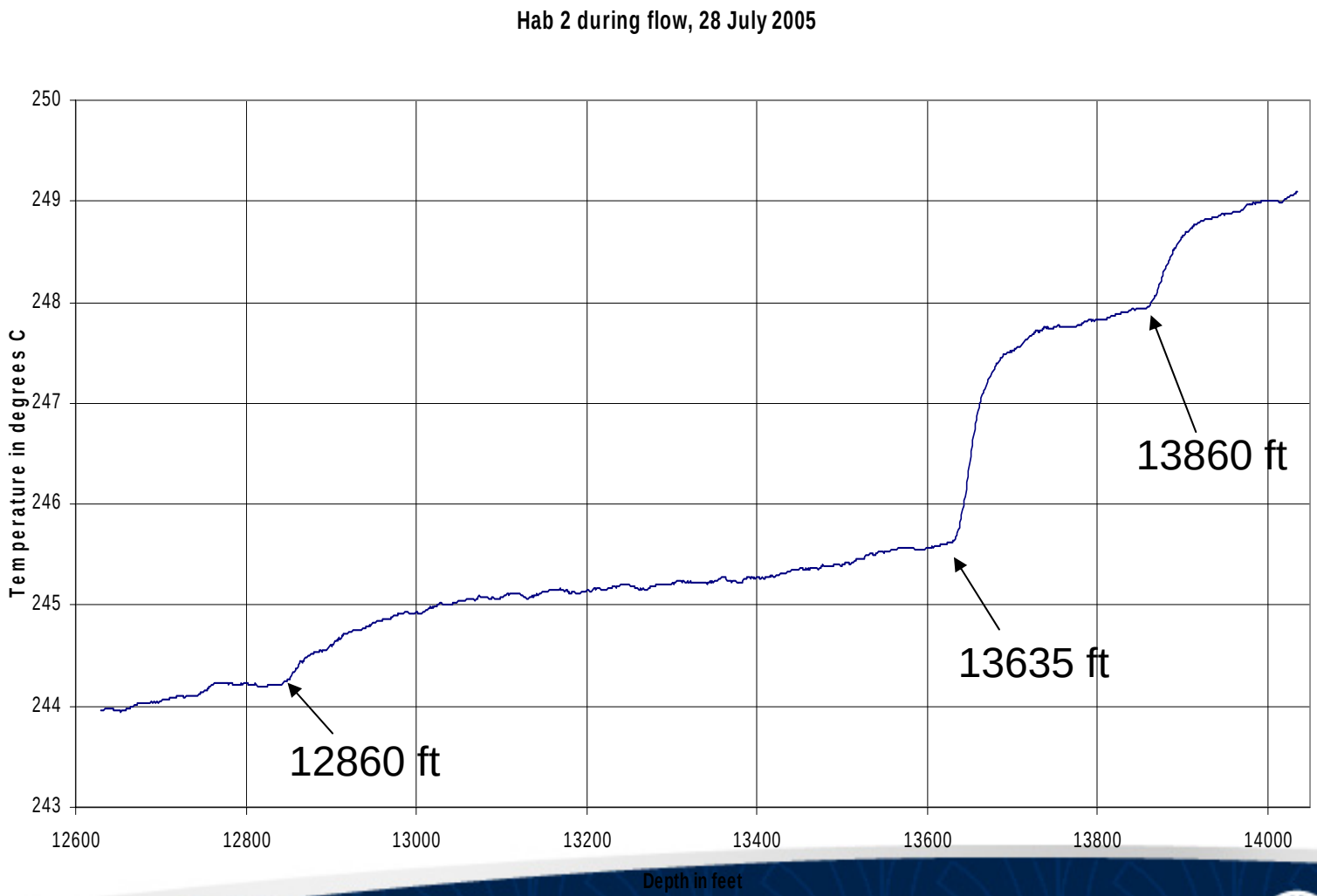
Borehole breakout chips



Habanero 2-ST1 –

Location of upper fractures based on logging



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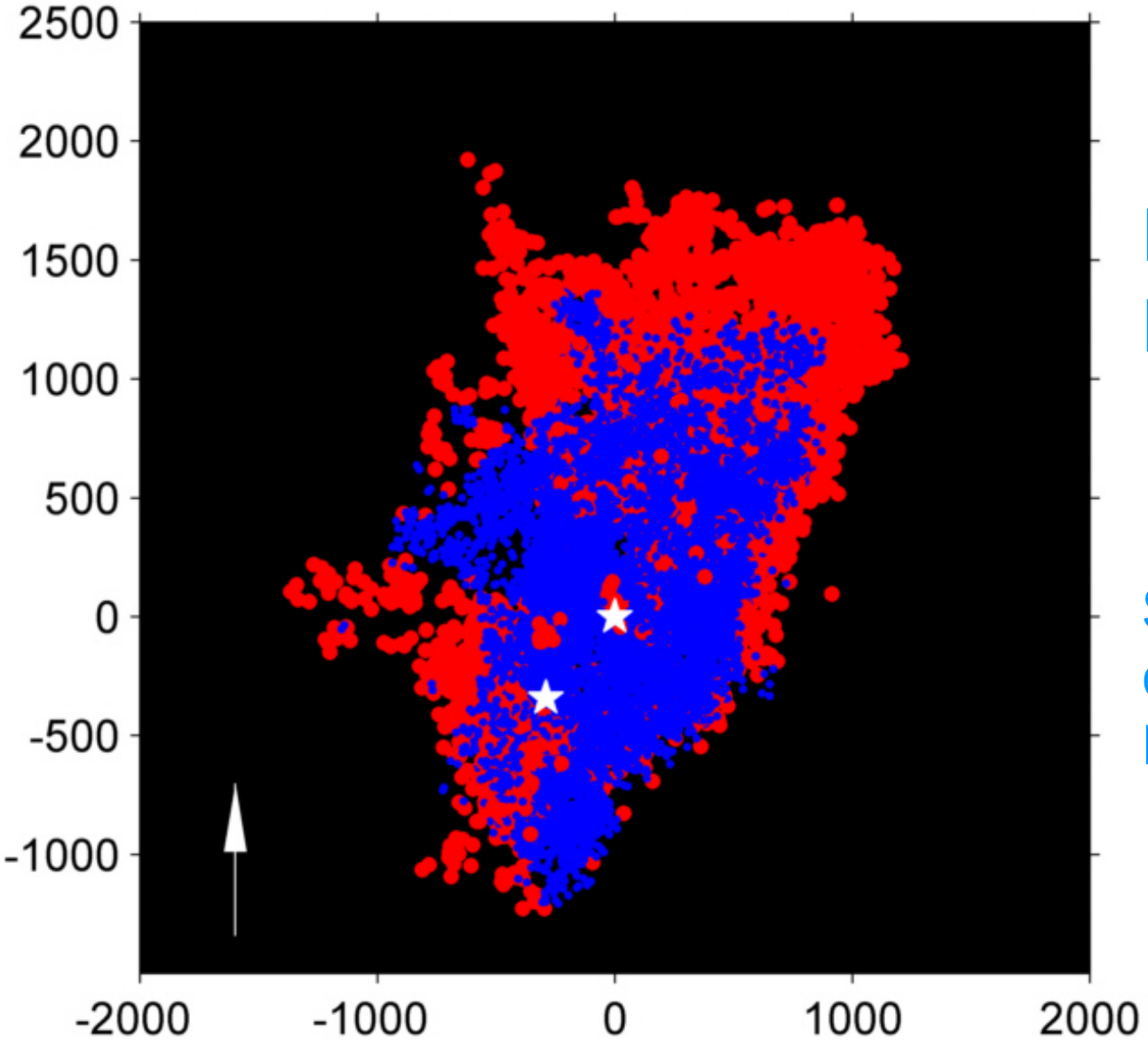
Hydraulic Stimulation program

- Eight down-hole recording instruments distributed over area of 45 km^2
- 2003 injection of 20,000 m^3 fresh water into Habanero 1 up to 9,800 psi (28,011 microseismic events located)
- Reservoir extended over 2.5 km^2 at 4250m depth.
- 2005 second injection of 20,000 m^3 (16,454 events located) began where earlier stimulation left off
- Second stimulation expanded reservoir by 50% to 4 km^2.
- Small independent upper reservoir stimulated from Habanero 2 in 2005 (1,283 events located)



Enhancement Phase

(Sept, 2005)

Second stimulation of Main Zone in Habanero 1

Scale in metres

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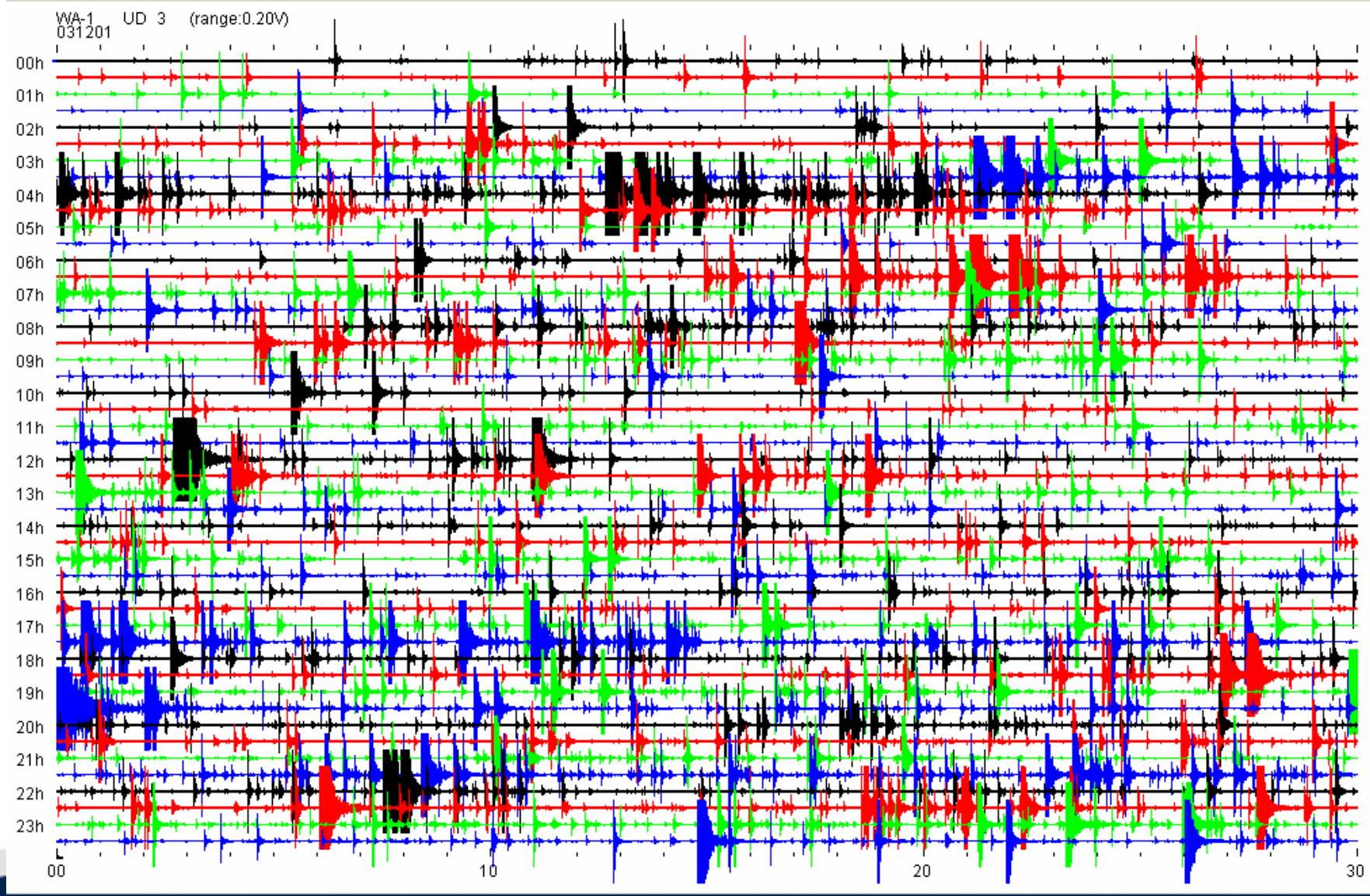
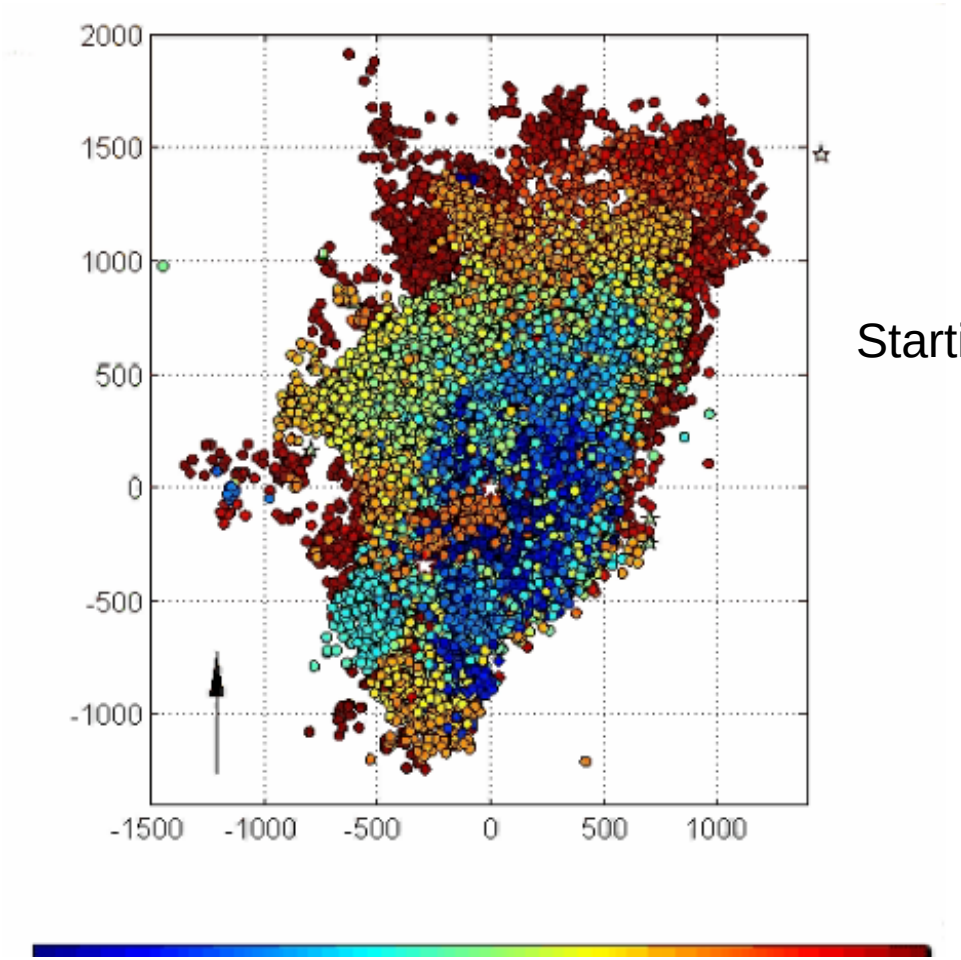
Example of Pen-record of one days stimulation from one geophone element

01/Dec/2003 WA-1 UD





Area in meters

Starting point of fracturing
(0,0)

November 2003

November 2006

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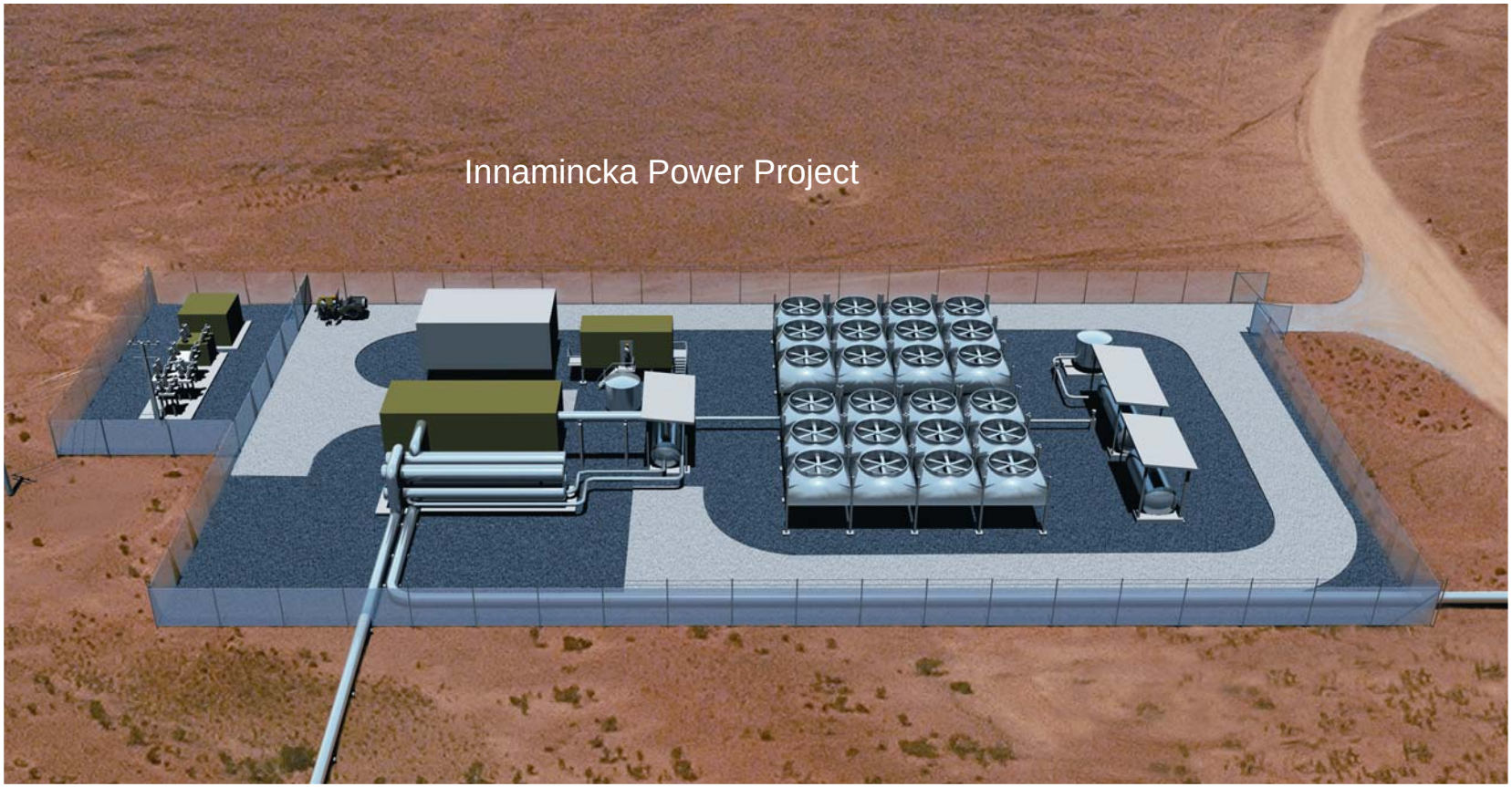
Conceptual Design of the Demonstration Kalina Cycle Air-Cooled Power Plant for the Cooper Basin HFR Project.



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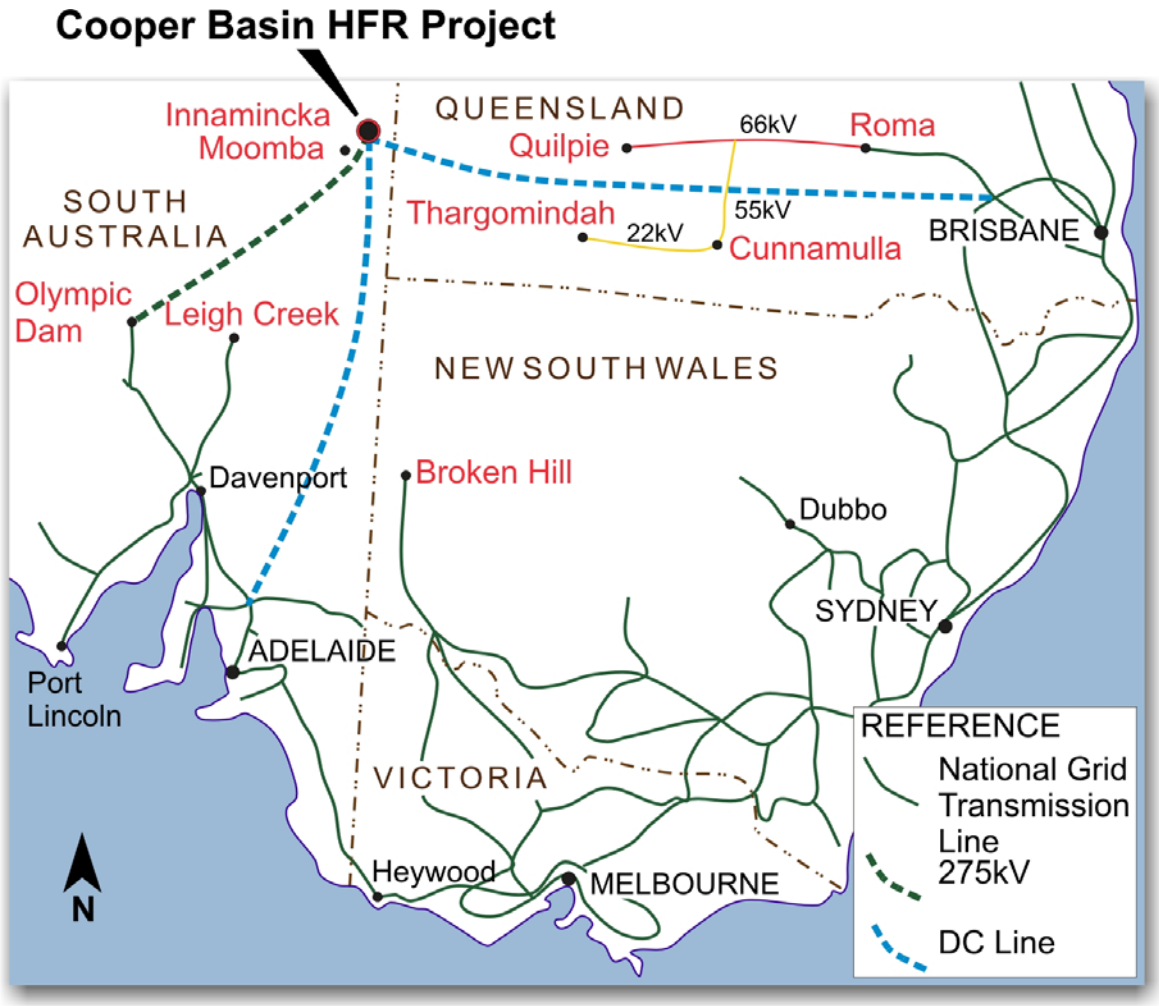
Connection to the National Electricity Market



The Cooper Basin HFR geothermal project is located 500km from the national grid.

Closing the grid through HV DC lines provides benefits on a national scale.

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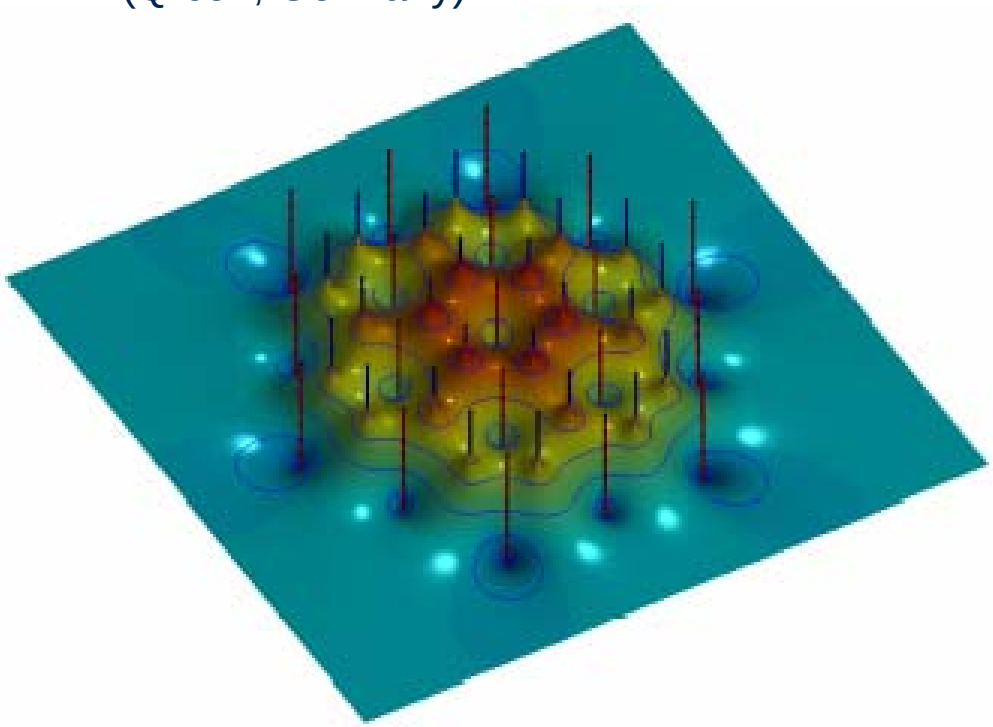
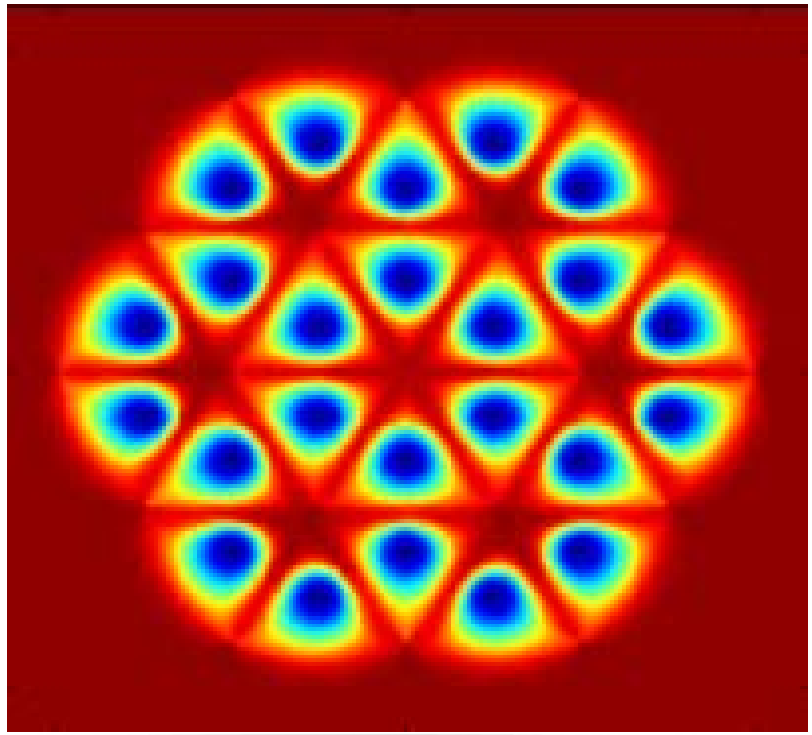
The Future

Computer modelling of large scale HFR development after 20 years of production (19 injection wells and 24 production wells)

(Q-con, Germany)





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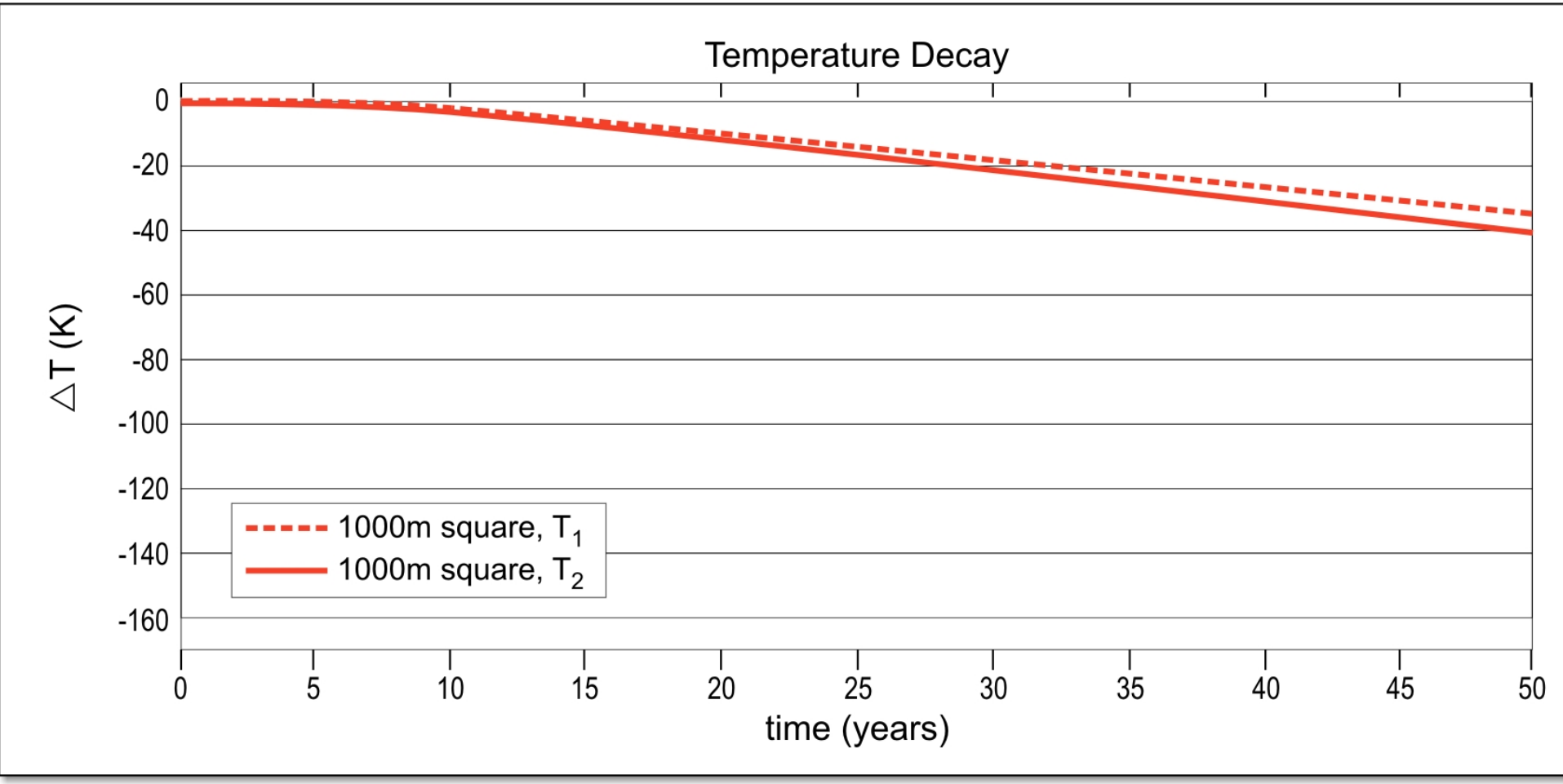
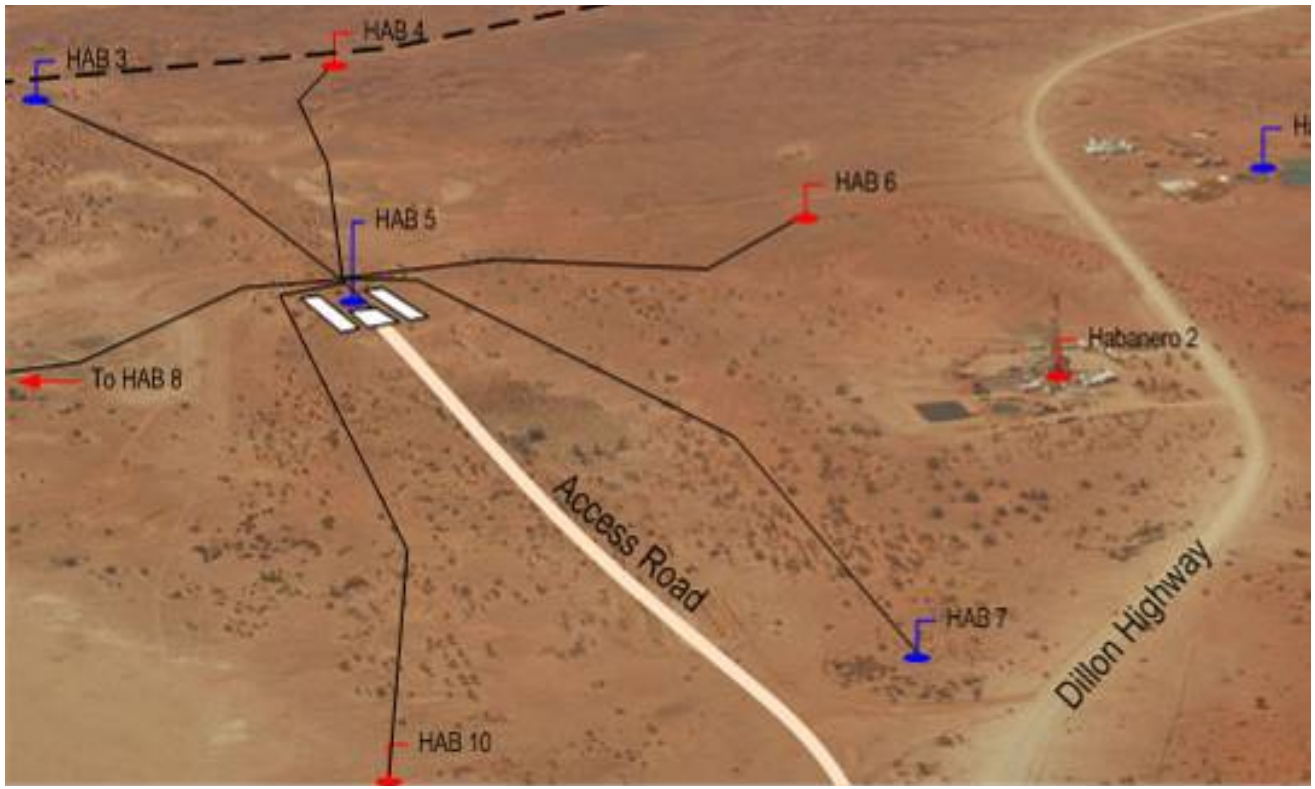
Long life - expected to be greater than 50 years based on temperature draw-down modelling



The Future

- Conceptual design for large scale commercial demonstration;
- Expect Government support (1:2) for 40 MW plant (LETDF).



- **3 injection wells;**
- **4 production wells;**
- **1km well spacing**
- **40MWe net.**

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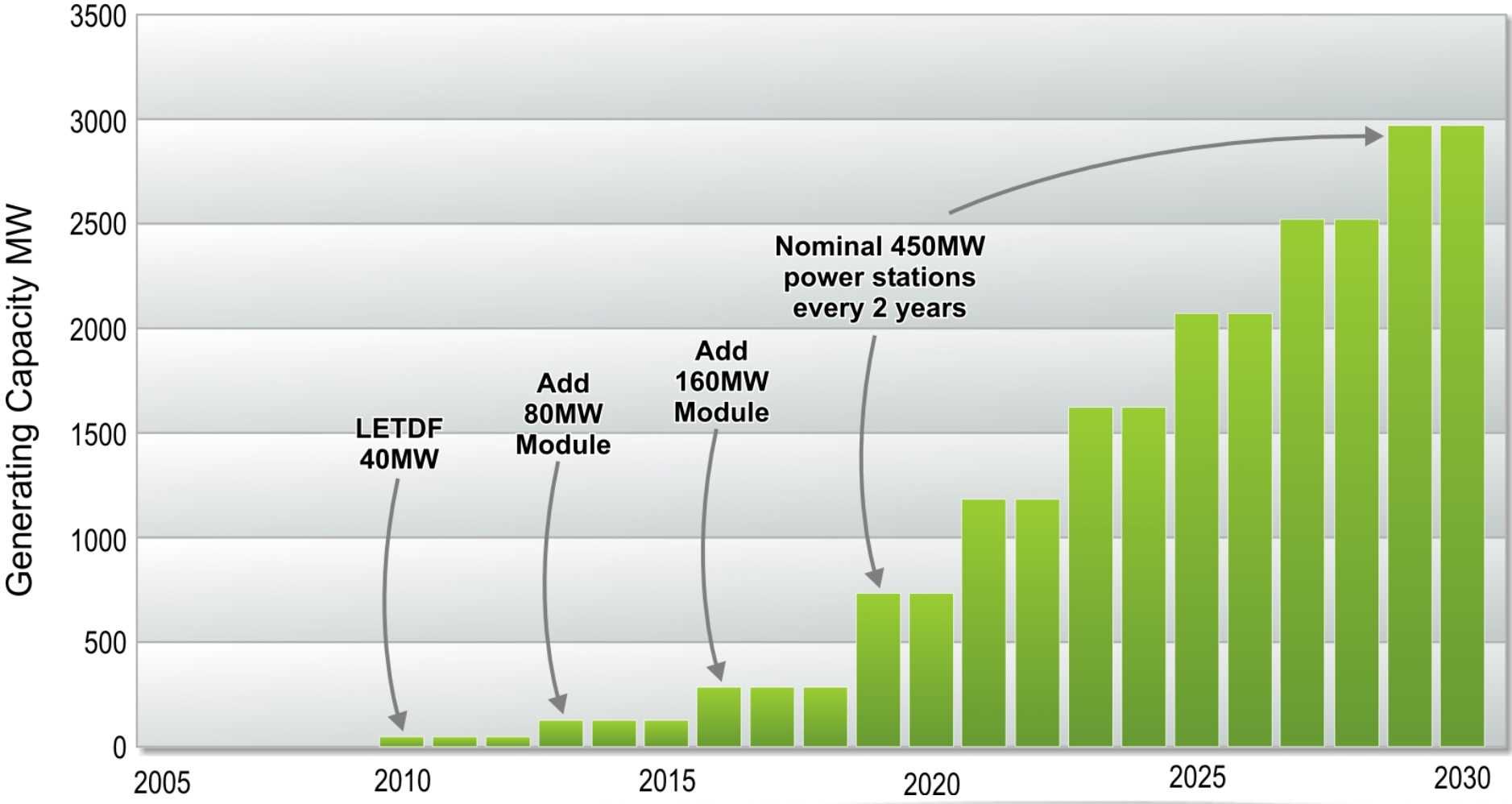
Geodynamics' Outlook for Growth in HFR Generating Capacity Based on its Cooper Basin Resources



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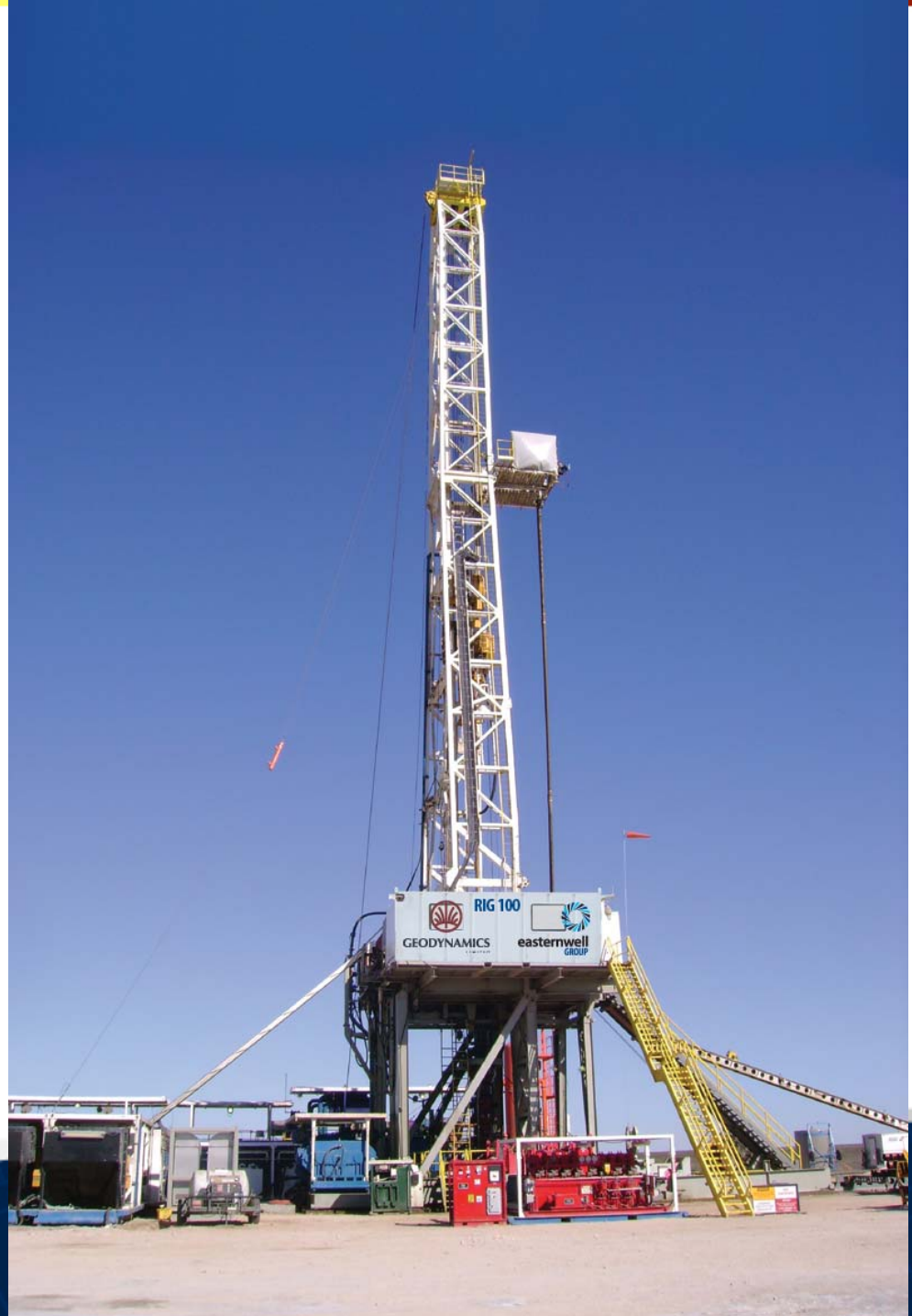
New 3000 Hp rig bound from Houston



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Rig on the water – due to arrive in Australia in 2 weeks