Automatic HC trap prospecting with seismic data

Brad Artman

brad@pangea

ABSTRACT

The purpose of this project is to develop a real-time interpretation package that will be capable of finding structural and stratigraphic traps on seismic data. Should it succeed, I further propose that the capability will make me rich. The method will be based on a LB single-phase fluid flow modeling algorithm.

1. The idea

The identification of structural and stratigraphic traps on a seismic section is of paramount importance for the exploration of hydrocarbons (HC). Automating the identification of likely traps could have four major contributions:

- greatly speed initial reconnaissance of new data,
- physically identify closures with shallow dip structure,
- aid in reservoir volumetrics, and
- assist in the understanding of HC migration.

A real-time algorithm that can accomplish these tasks can provide excellent qualitative information, limited quantitative scoping information, and quite possibly make me wealthy.

2. Approaches

- Percolation

  Fail! The whole section fills up

- Seed and Fill

  Fail! Needs global knowledge

- Flow modeling

  Global knowledge

  Single phase flow is fast(er)

  Single phase flow requires pool-proxy

3. Conclusions

- Maybe it is impossible

    Still too slow–Seems to require Global Solution

    Increased P gradient misses chanels

    Decreased P gradient slows convergence

    Pools are not well formed -not so bad

    Directionality does not help

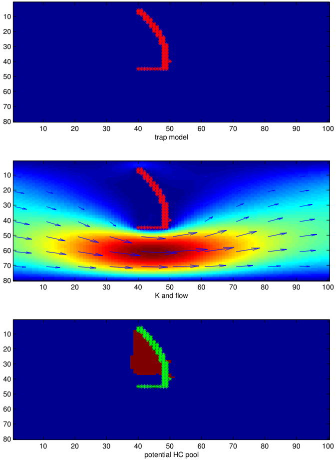

Figure 1: Simple model fig1 [NR]

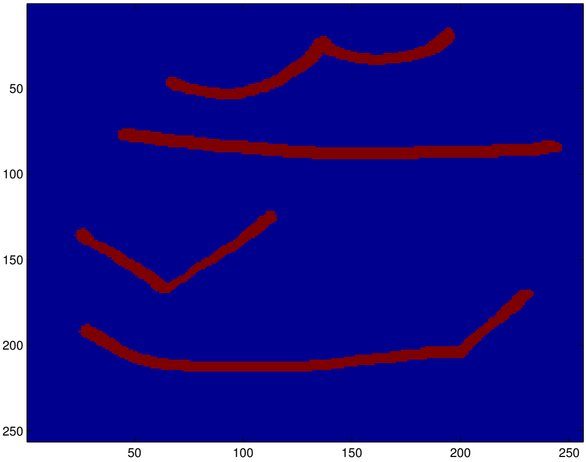

Figure 2: Simple model syn [NR]

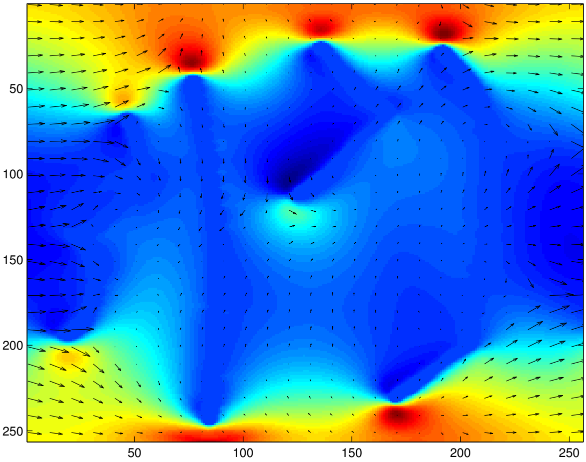

Figure 3: Simple model synflow [NR]

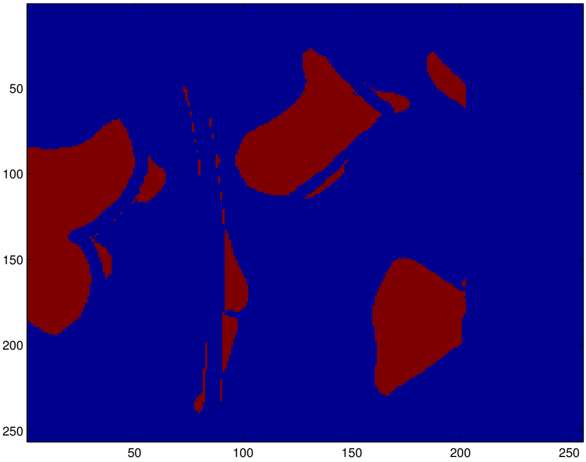

Figure 4: Simple model poolsynnostruc [NR]

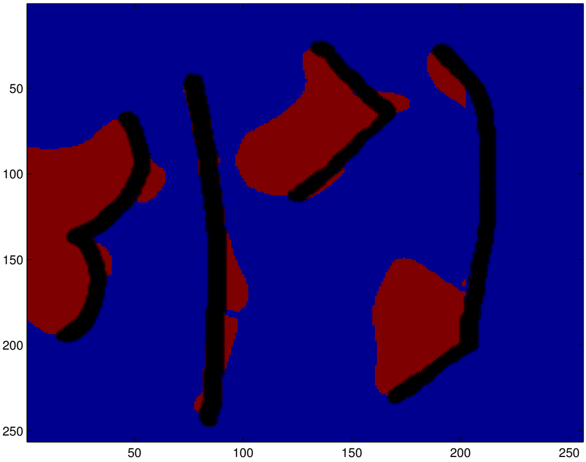

Figure 5: Simple model poolsyn [NR]

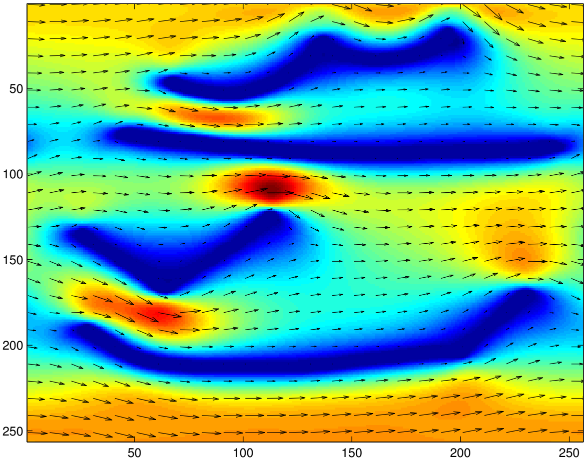

Figure 6: Simple model synflowside [NR]

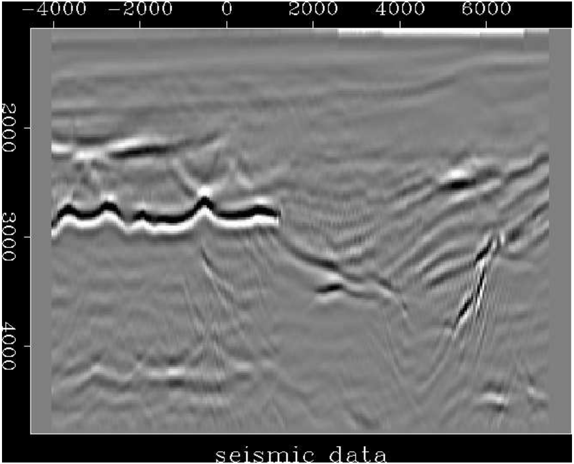

Figure 7: Simple model seis [NR]

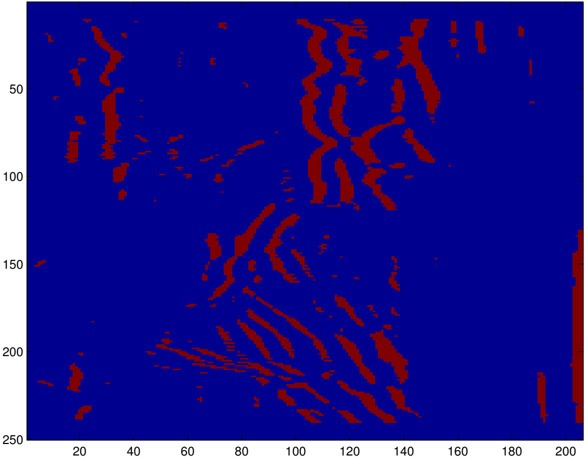

Figure 8: Simple model binseis [NR]

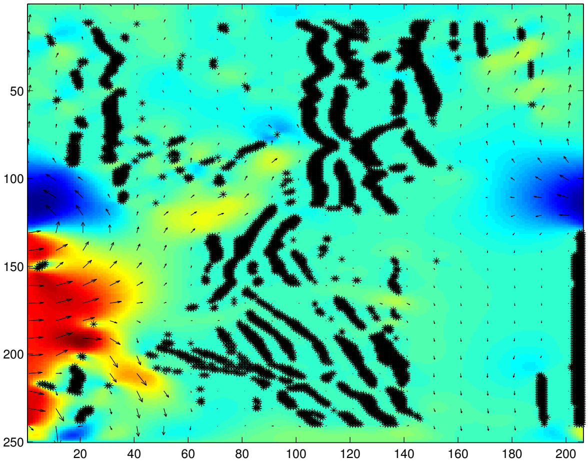

Figure 9: Simple model seisflow [NR]