

# SEDSIM, a brief overview

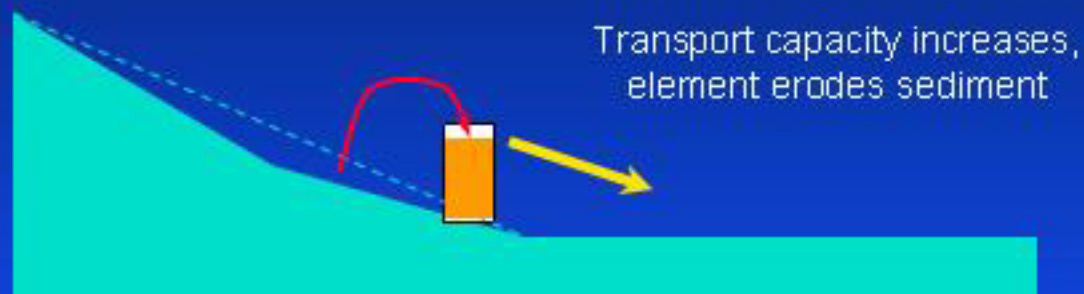
by Dan Tetzlaff  
WesternGeco

- Developed at Stanford in mid 1980's, under direction of John Harbaugh
- Subsequently improved and enlarged by many graduate students
- In 1990's continued as separate projects\*
  - CSIRO SEDSIM (Australian consortium)
  - Texaco STRATSIM
  - Others, based on published source code

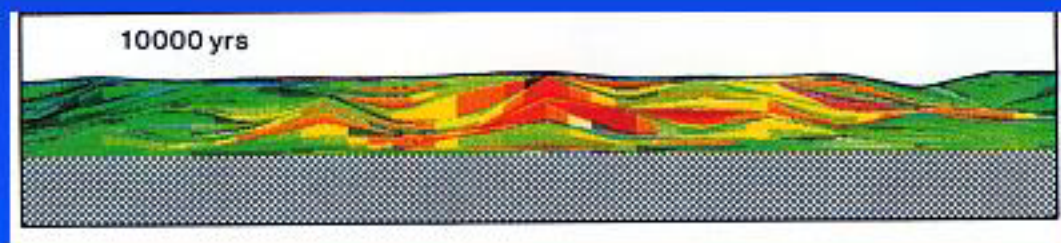
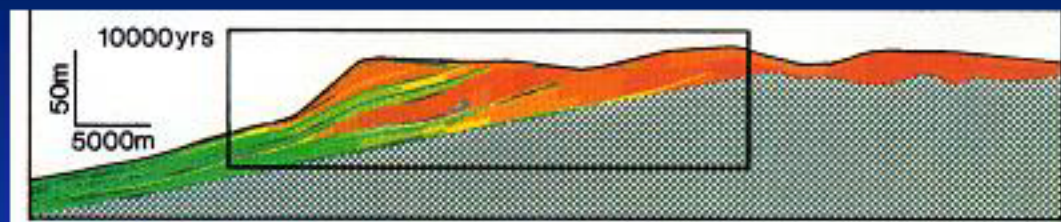
\* Correction: The program Dionisios (from Beicip/IFP) is NOT an offspring of SEDSIM

- 2+-D flow simulation (2D flow + depth)
- 3-D sedimentary deposits
- Multiple sediment types, continuous mix
- Particle-in-cell method:
  - Uses particles or “fluid elements” moving on a grid
  - Facilitates modeling of highly unsteady flow
  - Prevents numerical dispersion for sediment transport

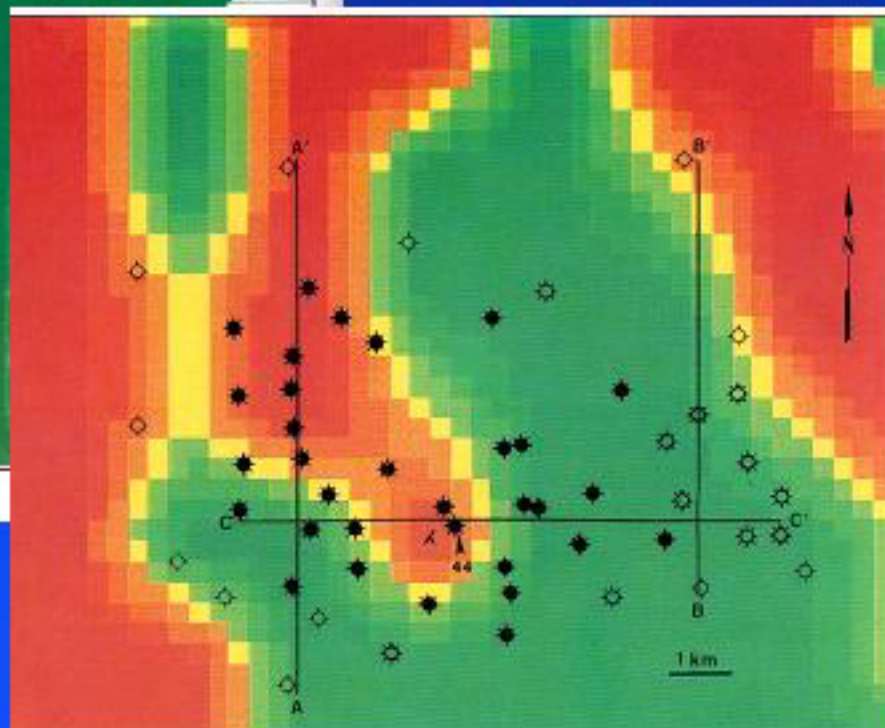
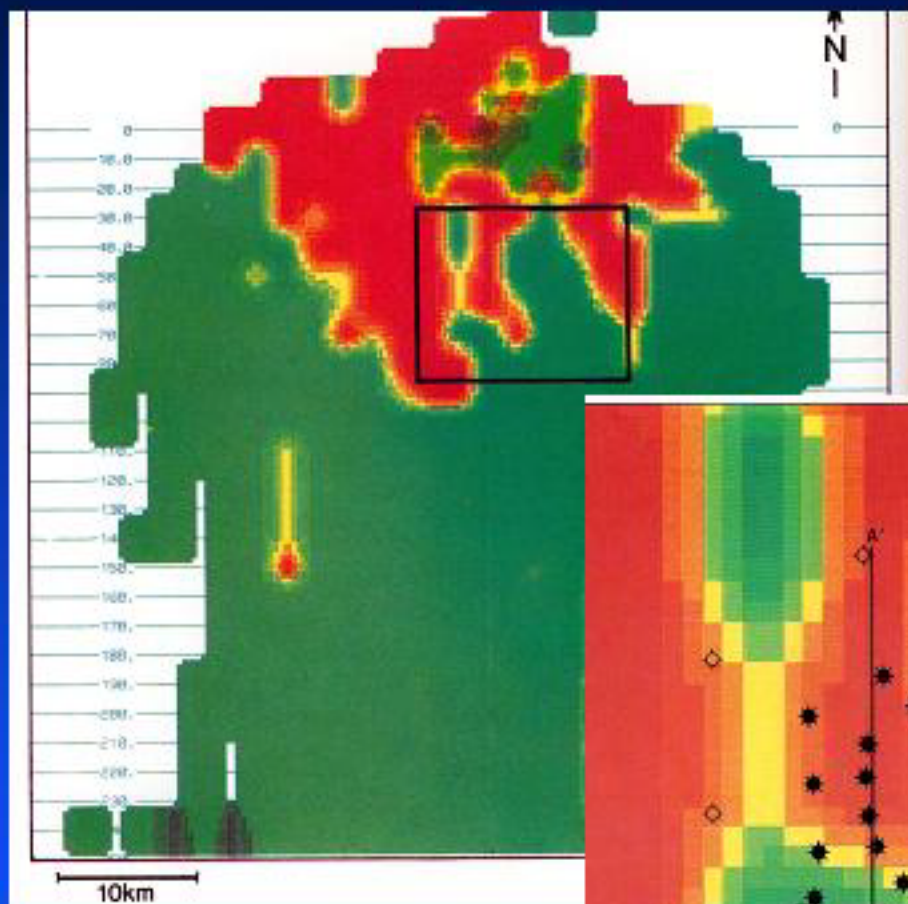
# Simplified Fluid Element Mechanism



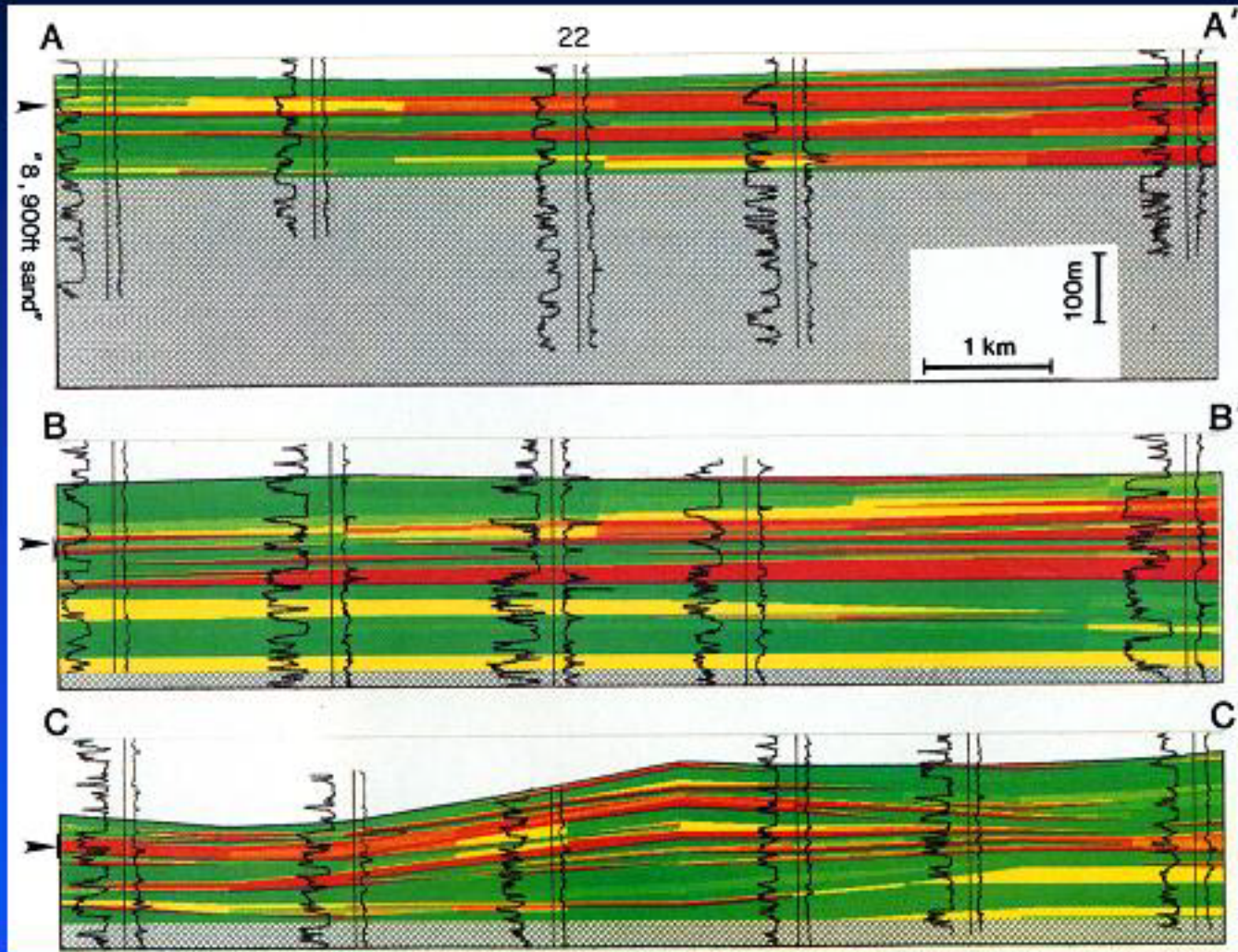
## Golden Meadow, LA, Deltaic System

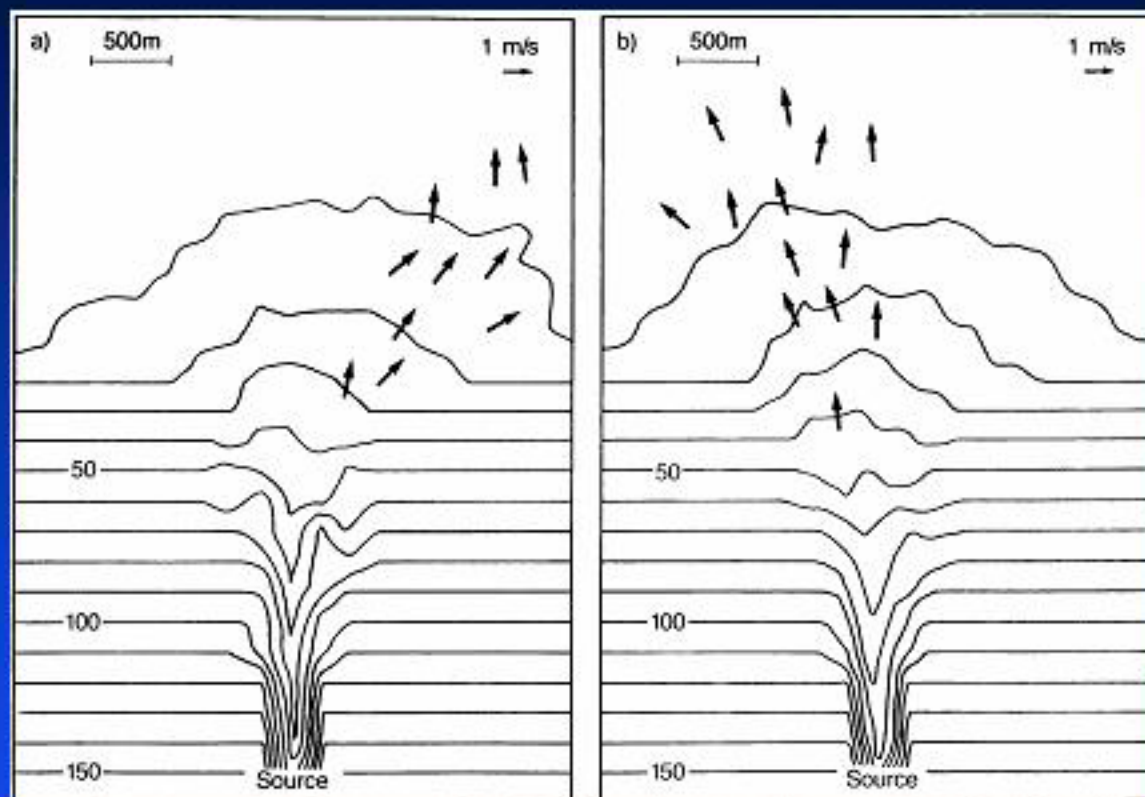


# SEDSIM Output Examples (Cont.)



# Log Correlation Using SEDSIM





After simulating several high-density turbidity currents, the model settles into a pattern that is neither cyclic nor totally disordered. Extremely small changes in input (left vs. right figure) will cause 10<sup>th</sup> flow to exit in different directions.



- **Martinez, P. A., and Harbaugh, J. W., 1993, Simulating nearshore environments, Pergamon Press, New York, 265 p.**
- **Merriam, D. F., and Davis, J. C., 2001, Geologic modeling and simulation, sedimentary systems, Kluwer Academic/Plenum Publishers, New York, 352 p. (in particular, pp. 45-70 & 71-98)**
- **Tetzlaff, D. A., and Harbaugh, J. W., 1989, Simulating Clastic Sedimentation, van Nostrand Reinhold, New York, 202 pp. (contains original source code)**