NEW VALUE FROM OLD GEOSCIENCE DATA

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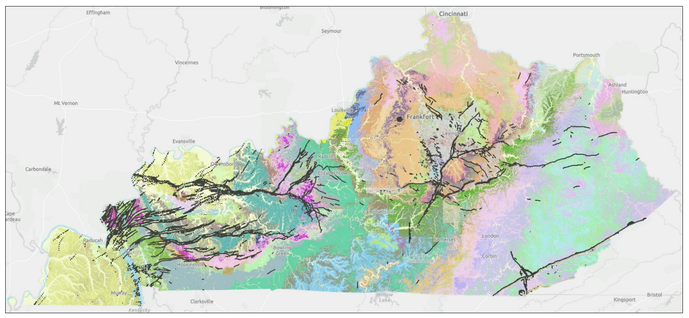
When it comes to geoscience data acquisition, there's no such thing "future-proofing."
Best time to acquire was yesterday. The next best-time, is today.

Public Data — Kentucky Geological Survey

KGS facilitates resource exploration, civil infrastructure, and health maps from geoscience data

- 1961-1978 — Public geologic mapping campaign
  - First state to be mapped at 1:24,000 resolution
  - Mapped all 707 7.5 minute quadrangles covering the state



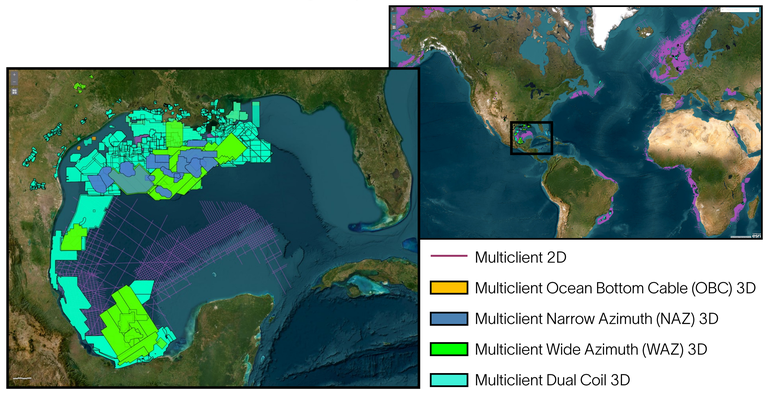
- 1999 — Economic study and survey commissioned [1]
  - $90 million spent mapping
  - $2.25 - $3.53 billion value (20 years of use)
  - Value to users: 25-35x the cost of the mapping program
  - Respondents: 17% (weighted avg) cost added to total project cost when geologic information wasn't available
  - Effects of non-availability of geologic maps [1]
    - Project costs increase by up to 40%
    - Substantial drop in well-drilling success
    - Most environmental projects unfeasible without
    - Expensive site-by-site mapping by contractor
    - Costly errors in engineering decisions
    - Delays in project completions

- Unintended Benefits & New Value: Radon Potential Maps [2]
  - Radon is formed the natural decomposition of uranium in local soil and rock
  - Geologic mapping combined with 70,000+ home radon test kit results to derive statewide indoor radon potential maps
  - These radon maps reduce Kentuckians' healthcare costs by $2.9 -$7.7 million per year by reducing cancer risk

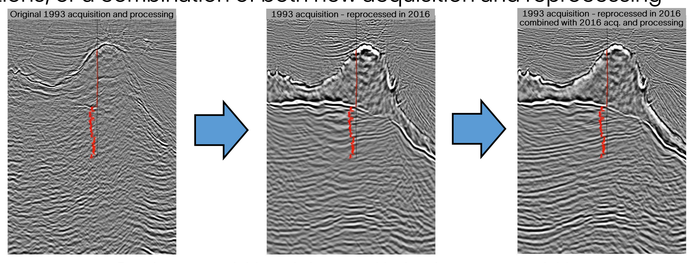
Private Data — Multiclient Oil & Gas

Private enterprises regularly acquire, modify and sell both publicly and privately available geoscience data

- SLB maintains one of the largest private data libraries in the industry

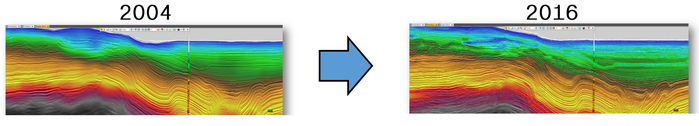


- Acquisition and processing technologies evolve at different rates
- New value can be added by implementing new processes, new acquisitions, or a combination of both new acquisition and reprocessing [3]



Previous acquisitions inform and help plan new acquisitions

- Another example of reprocessing original data to add new value [4]



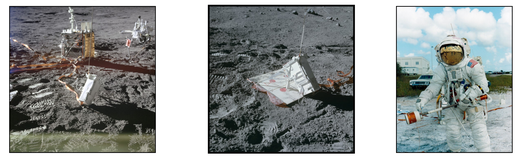
Typically, the same data can reprocessed every 4-6 years to attain new value

- Unintended Benefits & New Value: new uses of multiclient data
  - Offshore windfarms and carbon sequestration
  - Shallow hazards

Public Data — Apollo 17

Newly derived S-Wave data sheds light on engineering properties deeper than Apollo return samples

- 1968 — Active seismic acquired. Near surface lithologies mapped and corresponding P-wave velocities recorded



- 2009 — Converted to industry standard SEGY, opening the door for re-processing of initial data [5]

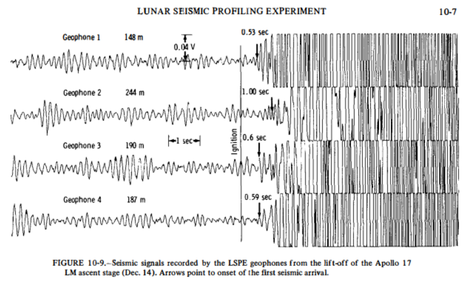
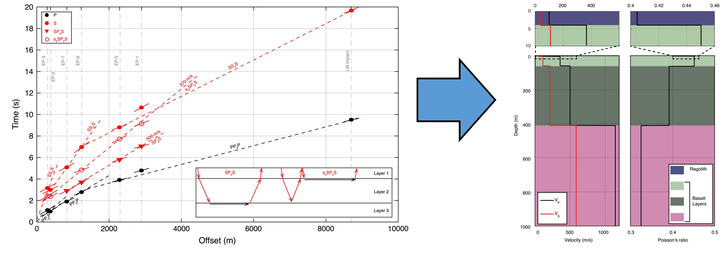


FIGURE 10-9.–Seismic signals recorded by the LSPE geophones from the lift-off of the Apollo 17 LM ascent stage (Dec. 14). Arrows point to onset of the first seismic arrival.

- 2015 — S-Wave data discovered! (borrowing gradiometric techniques from the oil and gas industry) [6]



- Red lines represent data that we didn't know was there. Using both P and S-wave properties. New rock physics properties can be calculated using both of these values.

Conclusions & Call to Action

- In each of these examples, previously collected datasets continue to offer value long after their original data acquisitions
- In each of these examples, unintended and unforeseen value is added years after data acquisition
- There's no such thing as a perfect data acquisition or processing
- Acquisition techniques and data processes are always improving, but not always at the same rate
- Instead of trying to design the perfect, future-proof survey, "off the shelf" acquisitions have massive potential
- The sooner subsurface acquisitions begin, the sooner we can start inventing and deriving new and unforeseen value

References

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3. Espinoza, C., O. Zdraveva, N. Moldovenau, B. Curd, and E. Gridnev (2016) *Full azimuth towed-streamer acquisition and broadband processing in an obstructed area of the Gulf of Mexico*, SEG Technical Program.
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