NGWA Groundwater SUMMIT 2017

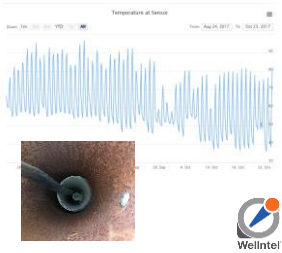
Acoustic technology provides new groundwater-level monitoring opportunities

Joseph Fillingham, PhD, Science Lead, Wellntel Inc.
Charles Dunning, PhD, VP Business Development, Wellntel Inc.
Douglas Cherkauer, PhD, Professor Emeritus, UWM and Consultant

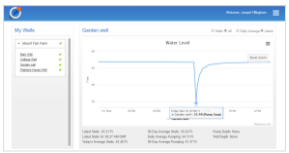
Acoustic sensors **minimize** contamination **risk** and operating **complexity**, **reducing** the **cost** per data-point

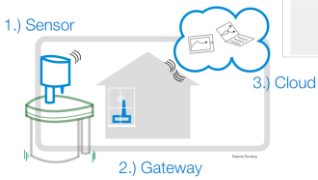
Acoustic sensors have been challenged by:

- **background noise** inside and outside the well,
- **obstructions** to signal path in wells, and
- **temperature** profiles in the well air column

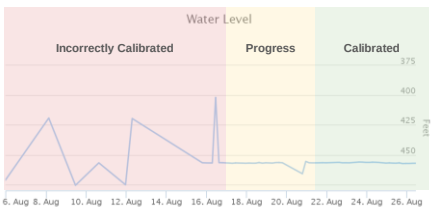


Enabling telemetry using nearby internet creates a robust monitoring system by...

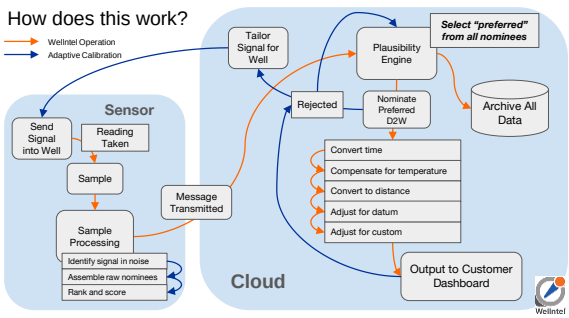




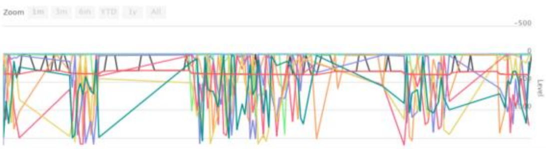
...bringing automated plausibility evaluation and historical analysis providing accurate water levels!



How does this work?

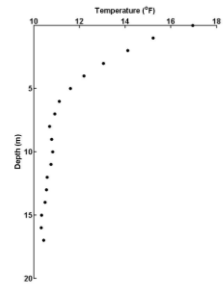


Finding the signal in the noise!



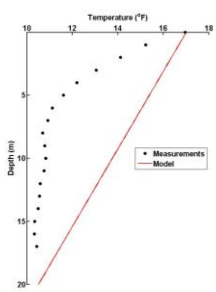
Compensating for the well air column temperature profile

1. Studied the air temperature profile in groundwater wells



Compensating for the well air column temperature profile

1. Studied the air temperature profile in groundwater wells
2. Identified an accurate model of air temperature gradients



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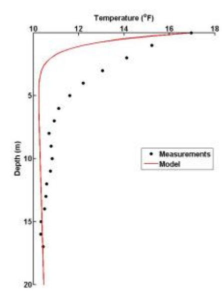

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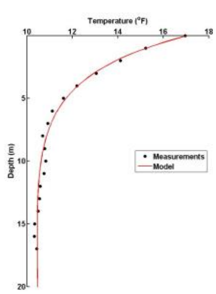
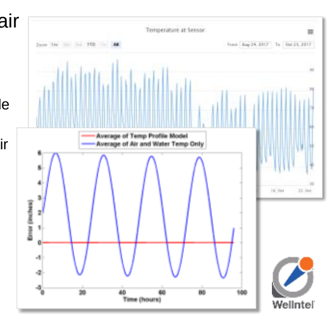
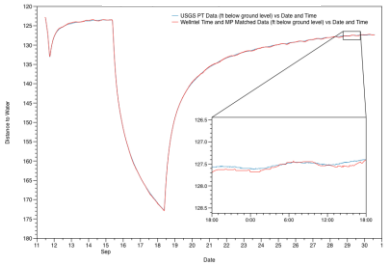


Compensating for the well air column temperature profile

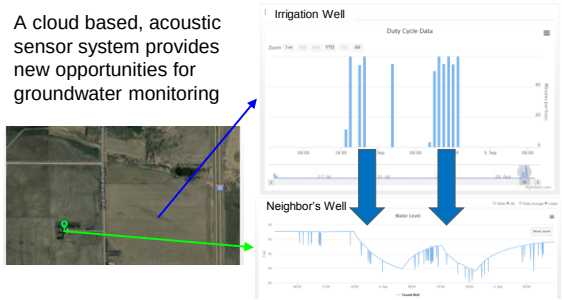
1. Studied the air temperature profile in groundwater wells
2. Identified an accurate model of air temperature gradients
3. Update the model based on measured air and water temperature
4. Use the model to calculate an average air temperature that can be used for compensation



The cloud based groundwater monitoring system is accurate and reliable



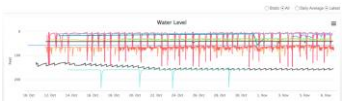
A cloud based, acoustic sensor system provides new opportunities for groundwater monitoring

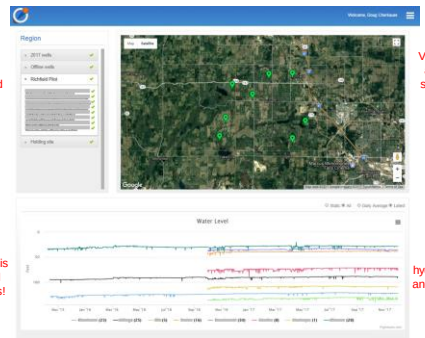


New opportunities to grow spatially dense networks that foster community engagement

- Data can be shared in useful formats
  - with volunteer well owners
  - with colleagues and team members
  - between agencies, or
  - not at all!
- Agencies and well owners engage around groundwater resource facts.

Neighbor, stakeholder group build network in Benton County, OR





Wells can be grouped for monitoring and management

View network and sensor status in real time

Extend analysis with Wellntel Data Services!

Toggle hydrographs on and off, zoom in and out

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Questions?

Joe Fillingham, Ph.D.
Science Lead, Wellntel, Inc.
jhfillingham@wellntel.com