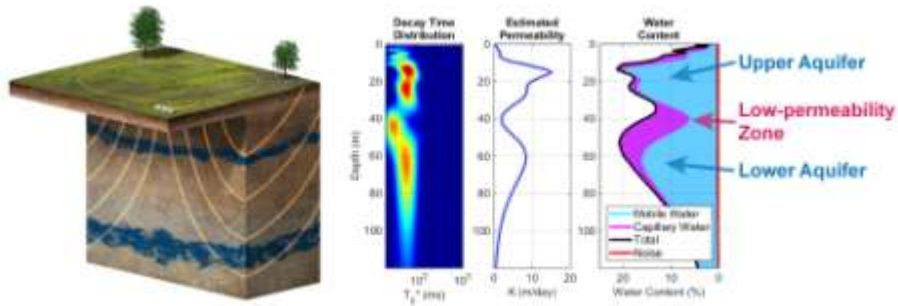


GMR™ Surface NMR Instruments

Direct, Non-invasive Detection and Imaging of Groundwater to Depths of up to 500 feet (150 Meters)

Surface magnetic resonance (also known as surface NMR, proton magnetic resonance and magnetic resonance sounding) is a powerful ground-based geophysical method used to non-invasively detect, measure and image groundwater.

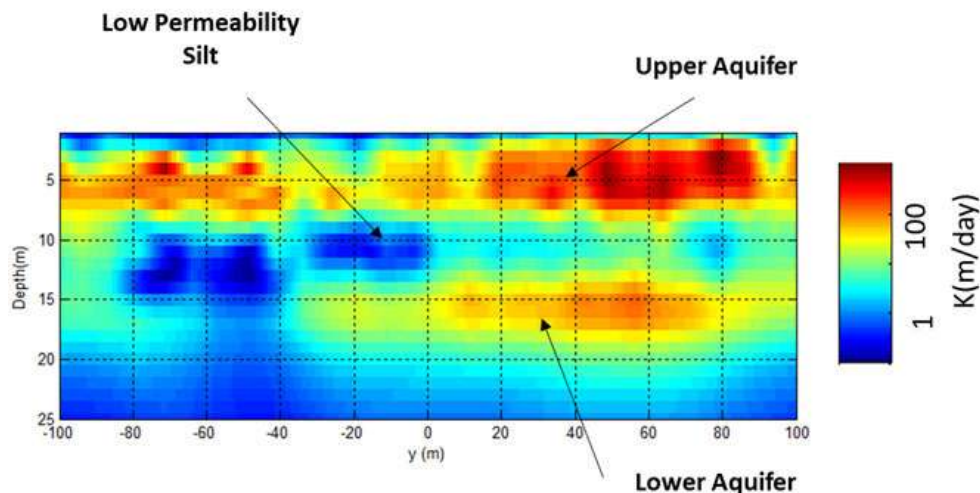
Vista Clara's GMR™ and GMR-Flex™ multi-channel surface NMR instruments work by using the same physics as medical MRI. Surface magnetic resonance measures hydrogen protons in groundwater to characterize aquifer properties, whereas medical MRI measures hydrogen in biological tissues to diagnose injury or disease.



Vista Clara's GMR™ instruments provide exceptional value for groundwater investigations due to their unique capabilities:

- GMR is the ONLY non-invasive geophysical method that can directly detect and image groundwater from the surface
- GMR directly quantifies volumetric water content
- GMR unambiguously differentiates moveable water in large pores from immovable water that bound in small pores
- GMR provides unambiguous estimates of hydrogeologic properties, including hydraulic conductivity and specific yield
- GMR provides high vertical resolution of the hydrogeologic properties described above, to depths of up to 500 feet (150 meters)

GMR™ surface NMR measurements can also be performed along 2D transects to provide direct 2-dimensional imaging of aquifer properties.



GMR surface NMR measurements are very cost-effective compared to exploratory drilling. And compared to other surface geophysical techniques, surface NMR is unambiguous when it comes to detecting and localizing producible groundwater.

Vista Clara was the first to develop and introduce multi-channel surface NMR instruments and techniques, and since 2005 Vista Clara pioneered all of the major hardware and software advances that have made surface NMR a viable and widely applied geophysical technique. All of these innovations are deeply embedded in Vista Clara's exceptionally capable GMR™ and GMRFlex™ Instruments.

Products:

GMR

Deep Multi-Channel Magnetic Resonance



Comprehensive GMR Hardware and Software Solution Set

GMR is the industry's leading solution for non-invasive characterization of groundwater and aquifer conditions below the surface. GMR was designed from the ground up to capture all of the advantages of multi-channel processing. GMR's sophisticated and powerful electronics and rugged instrumentation provides unmatched performance and superior results.

GMR Provides Unique and Important Technical Advantages:

- Highest power output (4800V/600A standard, 6000V/800A Optional) to enable the greatest depth of investigation
- Shortest measurement dead time of any 4000V+ instrument (< 5 ms).
- The industry's most flexible multi-channel architecture with 4 full-functional full-power transmit/receive channels standard, with optional field expansion to 8-channels
- Patented CPMG and Adiabatic pulse sequences provide immunity to the effects of magnetic geology, rapid acquisition of complete T2 relaxation data, and up to 3x higher NMR signal amplitude than traditional pulse sequences

Advanced surface NMR-specific electronics exhibiting wideband receive are packaged in a modular design with an emphasis on reliability, safety, and performance.

GMR-Flex™
Compact and Flexible Form Factor



Modular Design Provides Unparalleled Flexibility

Packaging the most advanced features into a lightweight platform, GMR-Flex enables fast and efficient surveying of shallower groundwater systems. Modular components can be combined to optimize depth of investigation while minimizing equipment weight and size. In its most compact configuration, the GMR-Flex Transmitter can be operated from batteries with no additional modules. Modules for Tuning and DC capacitance can be added to increase output power and depth of investigation. In addition to standard GMR features, the GMR-Flex also includes ultra-fast switching for dead-times of less than 1 ms.

GMR-Flex™ is the world's first mid-range surface NMR instrument, and its key features include:

- Highest power output (2000V/400A standard) for any compact surface NMR instrument, enabling resolution of aquifer properties to depths of up to 260 feet (80 meters)
- Modular design enables shallow and mid-depth surveying with reduced equipment
- Lightweight components with simple interconnections make set-up, moving and packing-up very fast and easy
- Shortest measurement dead time of any surface NMR instrument (< 1 ms)
- Flexible multi-channel architecture with 2 high voltage transmit/receive channels standard, with optional field expansion to 4-channels
- Patented CPMG and Adiabatic pulse sequences provide immunity to the effects of magnetic geology, rapid acquisition of complete T2 relaxation data, and up to 3x higher NMR signal amplitude than traditional pulse sequences

GMR-Flex uses the same data acquisition and processing software as the standard GMR, providing GMR-Flex users the same array of measurement, processing and imaging capabilities as users of the standard GMR.

GMR™ and GMR-Flex™ Advantages

Highest Level of Safety Engineering

Field operators need surface magnetic resonance equipment that has been professionally inspected by independent, licensed 3rd party safety engineering and compliance professionals. All of Vista Clara's products, including GMR, are reviewed through the initial design and product engineering stages by independent, 3rd party safety engineering compliance professionals. This level of safety engineering has required significant investment, but it makes Vista Clara's GMR instruments the safest available in the world

The GMR tuning unit has multiple layers of safety engineering including no-touch bus bars and a safety interlock circuit that prevents the system from operating if the tuning unit lid is not securely closed.



A key rule of safety around high-voltage (HV) is that an operator should never be required to touch an uninsulated or exposed electrical contact with their hands or fingers. GMR uses environmentally rated mating connectors that prevent the need for the operator to touch the electrical contacts.



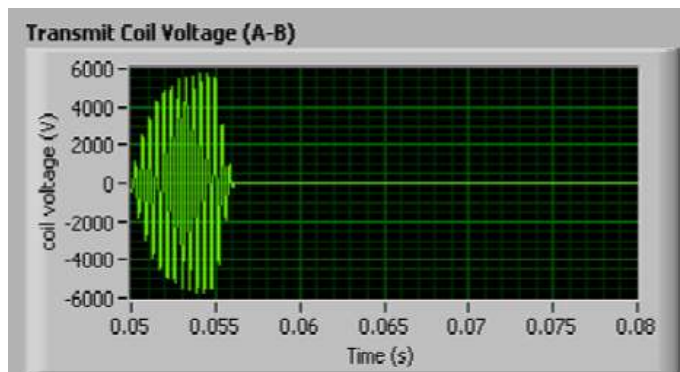
Other key safety features include:

- Automatic Fast- and Slow-Bleed Energy Dissipation
- Unambiguous "always on" indicators of bus voltage and power state
- Proprietary acquisition methods minimizing the time the system is at high stored energy potential



Highest Output Power and Largest Depth of Investigation

All of Vista Clara surface magnetic resonance instruments, including GMR, incorporate advanced H-bridge power conversion architectures that generate 2-times the output voltage and current from the same differential bus voltage, compared to competing manufacturers equipment. Our GMR instrument produces much higher current in a 100 m surface loop than other systems. Higher voltage and current increases depth of investigation and improves detection and resolution of fast relaxing signals. The GMR family also offers an extra-high-voltage (XHV) option that for the bigger GMR unit outputs 6000 V (12000 Vpp) and 800 A. The more compact GMR-Flex outputs 2000 V (4000 Vpp) and 400A, rivaling competitor's full-sized equipment. .



GMR Transmitter Coil Voltage

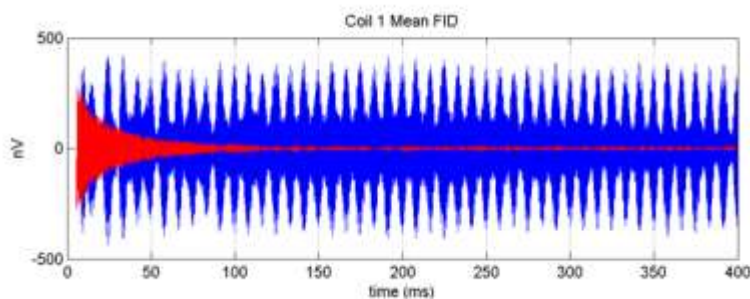
NOTE: Beware of competitors who only use Vpp as an output spec; “2000 Vpp” is a deceptive description of a product that produces a maximum coil voltage of 1000 V.

Shortest Measurement Dead Time

A very-short instrument dead time (i.e. the time it takes to switch from transmit to receive mode) is crucial to acquire reliable data because it allows capturing the earliest part of an FID signal, where the SNR is highest. It also allows detection of faster-relaxing signals that are invisible to instruments with long dead times, thereby resolving finer sediments. GMR incorporates proprietary transmit/receive switching electronics that provide shortest dead times among all surface magnetic resonance equipment. The standard GMR has a dead time of less than 5 ms, and the GMR-Flex has a dead time of less than 1 ms

Patented Wideband, High-Precision Receive Electronics

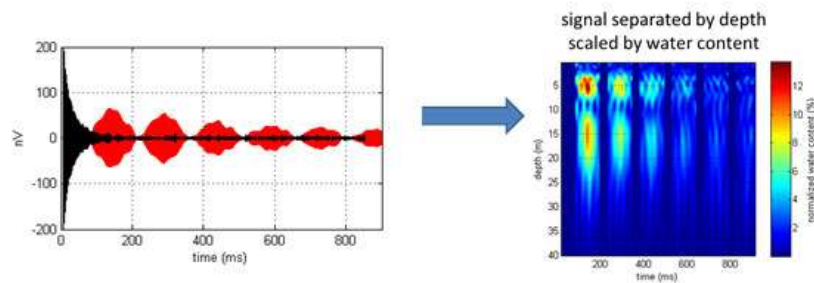
Vista Clara Inc. invented the technique of using multiple receive loops with adaptive signal processing to cancel noise in surface magnetic resonance data. This noise cancellation technique is an important development in the surface MR field in the past 2 decades and has enabled the surface MR method to be used much more broadly worldwide. The effectiveness of the noise cancellation technique is highly dependent on the detection and reference channels having identical broadband frequency responses. It’s also dependent on having a sophisticated and robust signal processing architecture. Instruments that utilize narrowband tuned receive coils, or a mixture of different tuned and untuned coils, are significantly limited in their ability to cancel space-time correlated noise due to different spectral mixing of noise sources in the different coils. GMR is the only system with up to 8 channels.



An example of the effectiveness of GMR’s sophisticated adaptive multi-channel noise cancellation process on data quality. Blue: single channel surface MR data before noise cancellation. Red: the same data after GMR’s adaptive noise cancellation.

Patented, Advanced Pulse Sequences to Overcome Low Signals and Magnetic Geology

In magnetic environments the FID signal undergoes additional relaxations and can no longer represent the true hydrogeology. Phase cycling on all pulse sequences enables detection of the true relaxation shape of the signal. The GMR instrument uses patented pulse sequences that are designed to unambiguously measure groundwater in magnetically-susceptible aquifer materials. These pulse sequences include Carr-Purcell-Meiboom-Gill (CPMG), Multiple Spin Echo with Phase Cycling and Crush Recovery. In addition, Vista Clara's software includes linear off-resonance inversion capability to accurately assess significant variations of the earth's field in the ground.



Left: an example of FID (black) and CPMG (red) signals acquired at a site with magnetic geology using GMR.
Right: GMR's high-resolution all-linear inversion maps magnetic resonance signals in depth while preserving wideband amplitude, phase and frequency information for enhanced pore-scale analysis.

Engineered for Durability and Longevity

Vista Clara's surface magnetic resonance instruments are engineered to the highest standards to enable reliability and performance in the widest range of conditions. The GMR proprietary features include rugged power electronics shock mounted for protection and longevity. In addition, capacitors, switching amplifiers and switches are all significantly over-rated for temperature, voltage and current for reliability and longevity. These instrument features cost more than lesser-engineered products, but ensure the reliability of the GMR product line. Unreliable geophysical equipment actually costs the user much more in the long run, due to loss of productive field time and cancellation of groundwater surveys, due to failed or inoperable equipment.

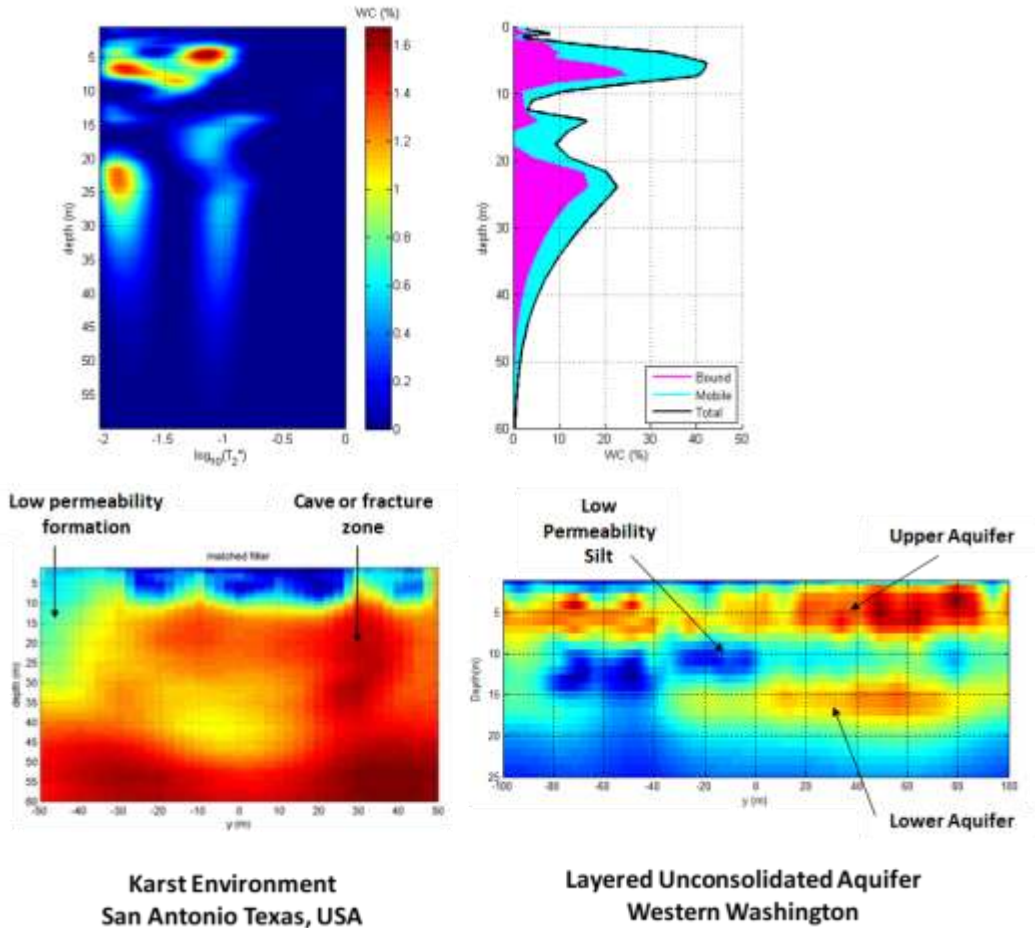


Complete, High-Performance User-Friendly Software

B-3, 1st Floor, Swapnil Apartment, Abhyankar Road, Dhantoli, Nagpur – 440012,
Telefax: 91 712 2427355, Website: www.aditiinfotech.org.

Users should be able to count on the manufacturer to provide the best available software tools to enable the effective processing and interpretation of the acquired data. The GMR processing and inversion software package includes:

- Interactive QC software
- All linear inversion for highest resolution and preservation of coherent signal amplitude and phase content
- Full spectrum visualization of relaxation distribution vs depth
- Full 2D inversion software



Examples of 2D surface NMR results obtained from the GMR software