|  |  |  |  |
| --- | --- | --- | --- |
| Word | Definition | Source | Image |
| Attenuation | Attenuation (seismic def)  (a) A reduction in the amplitude or energy of a signal, such as might be produced by passage through a filter. (b) A reduction in the amplitude of seismic waves, as produced by divergence, reflection and scattering, and absorption. (c) That portion of the decrease in seismic or sonar signal strength with distance that is not dependent on geometrical divergence, but on the physical characteristics of the transmitting medium.  Wave attenuation  A decrease in amplitude with distance from the source. | AGI  [Attenuation](https://glossary.americangeosciences.org/term/attenuationseis)  AGI  [Wave attenuation](https://glossary.americangeosciences.org/term/waveattenuation) |  |
| Bandpass (GPR processing technique) |  |  |  |
| Dewow (GPR processing technique) |  |  |  |
| Dielectric constant (also electric permittivity) | A complex electrical property of matter that influences radar returns. A measure of the displacement currents resulting from application of an electric field. Symbol: Ke. | AGI  [Dielectric constant](https://glossary.americangeosciences.org/term/dielectricconstant) |  |
| Diffraction | *Physics Definition*  (a) The departure of a ray from the path predicted by reflection and refraction. See also: *X-ray scattering*. (b) The process by which the direction of wave motion in any medium is modified by bending around the edges of an obstacle or scattering by a point discontinuity, and the resultant formation of an interference pattern within the geometric shadow of the obstacle.(c) An event produced by the termination of a reflector or refractor  *Seismic Definition*  (a) The generation and transmission in all directions of seismic wave energy in accordance with Huygens' principle. (b) An event observed on seismic data produced by diffracted energy. Diffraction events result at the termination of reflectors and are characterized on seismic records and sections by a distinctive curved alignment. | AGI  [Diffraction (physics)](https://glossary.americangeosciences.org/term/diffractionphys)  [Diffraction (seismic)](https://glossary.americangeosciences.org/term/diffractionseis) |  |
| Diffraction tomography  (Need more exact - look further) | Tomography  A method for finding the velocity distribution from a multitude of observations using combinations of source and receiver locations. Space is divided into cells, and the data are expressed as line integrals along raypaths through the cells. Application is usually iterative beginning with a starting velocity model. Often involves borehole-to-borehole or surface-to-borehole observations | AGI  [Tomography](https://glossary.americangeosciences.org/term/tomography) |  |
| Forward modeling | The technique of determining what a given sensor would measure in a given formation and environment by applying a set of theoretical equations for the sensor response. Forward modeling is used to determine the general response of most electromagnetic logging measurements, unlike nuclear measurements whose response is determined mainly in laboratory experiments. Forward modeling is also used for interpretation, particularly in horizontal wells and complex environments. In this case, iterative forward modeling is used. The set of theoretical equations (the forward models) can be 1D, 2D or 3D. The more complex the geometry, the more factors can be modeled but the slower the computing time. | Oilfield glossary  [Forward modeling](https://www.glossary.oilfield.slb.com/Terms/f/forward_modeling.aspx) |  |
| *Full-waveform inversion (FWI)*  *(?)* | A high-resolution seismic imaging technique that is based on using the entire content of seismic traces for extracting physical parameters of the medium sampled by seismic waves | SEG Library  Encyclopedia of Exploration Geophysics  "[An introduction to full waveform inversion](https://library.seg.org/doi/10.1190/1.9781560803027.entry6)" | " |
| Geophysics | Study of the Earth by quantitative physical methods. Basic divisions include solid-earth geophysics, physics of the atmosphere and hydrosphere, and solar-terrestrial physics. There are numerous specialties within the field, e.g. seismology, tectonophysics, engineering geophysics. The term is sometimes used to include instrumental study of the Moon and planets. | AGI  [Geophysics](https://glossary.americangeosciences.org/term/geophysics) |  |
| GPS | The NAVigation Satellite Timing and Ranging (NAVSTAR) GPS is a passive, satellite-based, navigation system operated and maintained by the Department of Defense. Its primary mission is to provide passive global positioning/navigation for land-, air- and sea-based strategic and tactical forces by observation of 24 satellites (4 each in 6 different 55-degree orbital planes) at 20-200 km altitude. It employs two frequencies in the 10-20 GHz band. The radio navigation system, which is used for surveying, navigation, tracking, and field data collection, is continuously available worldwide with 4 satellites observable. From observation of these, a stationary or moving receiver can calculate precise time, three-dimensional position (latitude, longitude, and height), and three-dimensional velocity based on triangulation. Each satellite broadcasts its location. Abbrev: GPS. A GPS receiver is simply a range measurement device: distances are measured between the receiver point and the satellites, and the position is determined from the intersections of the range vectors. These distances are determined by a GPS receiver which accurately measures the time it takes signals to travel from the satellites to the station. This measurement process is similar to that used in conventional pulsing marine navigation systems and in phase comparison electronic distance measurement land surveying equipment | AGI  [Global Positioning System](https://glossary.americangeosciences.org/term/globalpositioningsystem) |  |
| Gravity (geophysics technique) | The Earth's gravitational field, or the attractive force produced by the mass of the Earth. Variations in the gravitational field can be used to map changes in the density of formations in the Earth. Gravity surveys can be used to map the extent or depth of sedimentary basins or even individual hydrocarbon prospects | Oilfield glossary  [Gravity](https://www.glossary.oilfield.slb.com/Terms/g/gravity.aspx) |  |
| Ground Penetrating Radar (GPR) | A means of exploration of the Earth's shallow subsurface with radar energy, commonly in the 10-MHz to 1,000-MHz band. Commonly the two-way traveltime for reflected radar waves defines depth in the Earth where changes in radar propagation occur. Abbrev: GPR. | AGI  [Ground Penetrating Radar](https://glossary.americangeosciences.org/term/groundpenetratingradar) |  |
| Handheld X-ray fluorescence spectroscopy (XRF) | A type of X-ray emission spectroscopy in which the characteristic X-ray spectrum of a substance is produced by using X-rays of short wavelength to induce the substance to fluoresce and emit secondary X-rays of a longer wavelength. A series of diffraction gratings collects the photons generated by the fluorescence of each element in the sample, and the concentration of each element is determined by comparison and standards. Abbrev: XRF | AGI  [X-ray fluorescence spectroscopy](https://glossary.americangeosciences.org/term/xrayfluorescencespectroscopy) |  |
| Inversion | Construction of a geophysical model from a set of measurements to determine the values of a property that could be responsible for the measurements; e.g., using numerous gravity measurements to infer subsurface density distributions, calculating a synthetic sonic log from a seismic reflection trace, or using slip vectors and spreading rates to define global plate motions. Without additional constraints, inversion models are inherently ambiguous. | AGI  [Inversion (geophysics)](https://glossary.americangeosciences.org/term/inversiongeophys) |  |
| Lateral resolution  Need better | Resolution  The ability to distinguish between separate points or objects, such as sedimentary sequences in a seismic section. High frequency and short wavelengths provide better vertical and lateral resolution. Seismic processing can greatly affect resolution: deconvolution can improve vertical resolution by producing a broad bandwidth with high frequencies and a relatively compressed wavelet. Migration can improve lateral resolution by reducing the size of the Fresnel zone. | Oilfield Glossary  [Resolution](https://www.glossary.oilfield.slb.com/Terms/r/resolution.aspx) |  |
| Lava tubes | Lava tube  A conduit formed of hardened lava, on or within a lava *flow*through which lava flows to an advancing flow front. Also, a cavernous segment of the conduit remaining after flow ceases (Larson, 1990). Lava tubes have been surveyed that extend for tens of kilometers, although they are generally fragmented into shorter stretches  Lava tube system  A distributive network of *lava tubes*that is characteristic of tube-fed pahoehoe flows and the principal means by which such flows are so widely and thinly spread. It is usually broadly dendritic in pattern with an identifiable master tube (Larson, 1990). | AGI  [Lava tube](https://glossary.americangeosciences.org/term/lavatubespeleo)  AGI  [Lava tube system](https://glossary.americangeosciences.org/term/lavatubesystem) |  |
| Lidar | A method and instrument that measure distance to a reflecting object by emitting timed pulses of light and measuring the time between emission and reception of reflected pulses. The measured time interval is converted to distance (Geo-One-Stop, 2003, p.3). Shortened forms: lidar, LiDAR. Abbrev: LIDAR. | AGI  [Light detection and ranging](https://glossary.americangeosciences.org/term/lightdetectionandranging) |  |
| Magnetic (geophysics technique) | *Email to clarify* | Oilfield glossary  Other options - which technique? |  |
| Maxwell's equations | A group of four partial differential equations that describe all classical phenomena, involving electric and magnetic fields. James Clerk Maxwell (1831 to 1879), a British physicist, first wrote out this complete set of equations:  (1.) ∇·**D** = ρ  (2.) ∇×**H** = **J** + (∂**D**/∂*t*)  (3.) ∇·**B** = 0  (4.) ∇×**E** = −(∂**B**/∂*t*),  where **D** = electric displacement; ρ = electric charge density; **H** = magnetic field strength; **J** = electric current density; **B** = magnetic flux density; **E** = electric field strength.  Equation (1) is equivalent to Coulomb's law, the inverse square attraction of static electric charges. Equation (2) is Ampere's law relating magnetic fields and currents, which was extended by Maxwell to include induction of a magnetic field by a time-varying electric displacement. Equation (3) is Coulomb's law for magnetic flux, expressing the absence of isolated magnetic charges. Equation (4) is Faraday's law of induction, relating an electric field to a time-varying magnetic flux. Maxwell's equations are the starting point for all calculations involving surface or borehole EM methods. | Oilfield glossary  [Maxwell's Equations](https://www.glossary.oilfield.slb.com/Terms/m/maxwells_equations.aspx) |  |
| Migration (GPR processing technique) |  |  |  |
| Pillars | Rock pillar (speleo)  In a cave, a columnlike structure that is residual bedrock rather than a *speleothem.*  Pillar (speleo)  Bedrock support remaining after removal of surrounding rock by solution and/or collapse. | AGI  [Rock pillar](https://glossary.americangeosciences.org/term/rockpillarspeleo)  [Pillar](https://glossary.americangeosciences.org/term/pillarspeleo) |  |
| Pit-rich environments |  |  |  |
| Ray-tracing | Determining the arrival time at detector locations by following raypaths which obey Snell's law through a model for which the velocity distribution is known. Ray tracing represents a high-frequency approximation to the wave equation. | AGI  [Ray tracing](https://glossary.americangeosciences.org/term/raytracing) |  |
| Ricker wavelet | A zero-phase wavelet used in seismic modeling. It is the second derivative of the Gaussian function. Named for Norman H. Ricker (1896-1980), American geophysicist.  (Also, zero-phase wavelet)  Describing a wavelet symmetric about zero time. It is the shortest possible wavelet for any given spectrum. | AGI  [Riker wavelet](https://glossary.americangeosciences.org/term/rickerwavelet)  AGI  [Zero-phase](https://glossary.americangeosciences.org/term/zerophase) |  |
| Rock heterogeneity (heterogeneous rock) | Heterogeneous  Said of a material that has properties such as seismic velocity, density, or anisotropy that vary from point to point in the material.  Heterogeneous Formation  Formation with rock properties changing with location in the reservoir. Some naturally fractured reservoirs are heterogeneous formations. | AGI  [Heterogeneous](https://glossary.americangeosciences.org/term/heterogeneousgeophys)  Oilfield Glossary  [Heterogeneous Formation](https://www.glossary.oilfield.slb.com/Terms/h/heterogeneous_formation.aspx) |  |
| Rock homogeneity (homogeneous rock) | Homogeneity  The quality of uniformity of a material. If irregularities are distributed evenly in a mixture of material, the material is homogeneous. | Oilfield Glossary  [Homogeneity](https://www.glossary.oilfield.slb.com/Terms/h/homogeneity.aspx) |  |
| Seismic (geophysics technique) | Pertaining to waves of elastic energy, such as that transmitted by P-waves and S-waves, in the frequency range of approximately 1 to 100 Hz. Seismic energy is studied by scientists to interpret the composition, fluid content, extent and geometry of rocks in the subsurface. "Seismic," used as an adjective, is preferable to "seismics," although "seismics" is used commonly as a noun | Oilfield glossary  [Seismic](https://www.glossary.oilfield.slb.com/Terms/s/seismic.aspx)  Other options - which technique? |  |
| Signal-to-noise ratio (SNR) | The ratio of desirable to undesirable (or total) energy. The signal-to-noise ratio can be expressed mathematically as S/N or S/(S+N), although S/N is more commonly used. The signal-to-noise ratio is difficult to quantify accurately because it is difficult to completely separate signal from noise. It also depends on how noise is defined | Oilfield Glossary  [signal-to-noise ratio](https://www.glossary.oilfield.slb.com/Terms/s/signal-to-noise_ratio.aspx) |  |
| Time zero correction (GPR processing technique) |  |  |  |
| *Time-to-depth conversion*  *(no "exact", pulled two similar)* | Depth Conversion  The process of transforming seismic data from a scale of time (the domain in which they are acquired) to a scale of depth to provide a picture of the structure of the subsurface independent of velocity. Depth conversion, ideally, is an iterative process that begins with proper seismic processing, seismic velocity-analysis, and study of well data to refine the conversion. Acoustic logs, check-shot surveys and vertical seismic profiles can aid depth conversion efforts and improve correlation of well logs and drilling data with surface seismic data.  Time-Depth Curve  A tabular or graphical expression of the relation between velocity and arrival time of vertically travelling seismic reflections. It permits reflection time measurements to be converted to the corresponding depths. | Oilfield Glossary  [Depth Conversion](https://www.glossary.oilfield.slb.com/en/Terms/d/depth_conversion.aspx)  AGI  [Time-depth curve](https://glossary.americangeosciences.org/term/timedepthcurve) |  |
| Tomography | A method for finding the velocity distribution from a multitude of observations using combinations of source and receiver locations. Space is divided into cells, and the data are expressed as line integrals along raypaths through the cells. Application is usually iterative beginning with a starting velocity model. Often involves borehole-to-borehole or surface-to-borehole observations. *Reflection tomography*involves observations of reflected events. The result is to determine a velocity for each cell to best match observed travel times. Sometimes amplitudes are measured to determine an attenuation factor for each cell. *Layer tomography*is a variation in which the locations of the cells are constrained by specifying layering. Tomographic methods include the algebraic reconstruction technique (ART), the *simultaneous reconstruction technique*(SIRT), and Gauss Seidel methods (Ivansson, 1986). Etymol: Greek "section drawing". | AGI  [Tomography](https://glossary.americangeosciences.org/term/tomography) |  |
| Topo-correction (GPR processing technique) |  |  |  |
| Vertical resolution | A distance that characterizes the ability of a logging tool to resolve changes parallel to the tool axis. The word vertical implies a vertical well, but the term is used at other wellbore deviations. The vertical resolution summarizes the vertical response of the measurement in one or more distances. Most quoted vertical resolutions assume a homogeneous formation with stated properties. Vertical resolutions can vary considerably in more complex conditions, and at different values of the properties concerned. They should be considered only a qualitative guide to tool response. There are several different definitions of the vertical resolution distance. First, and most commonly, it is the interval within which a large percentage, typically 90%, of the vertical response occurs. Second, it is the minimum bed thickness needed for the measurement to read within a small percentage, typically 10%, of the true value at the center of the bed. Third, it may refer to the smallest bed thickness for which a significant change can be detected by the measurement. For acoustic and electromagnetic propagation measurements, it is taken, with reasonable accuracy, as the span of the receiver array. For nuclear and nuclear magnetic resonance measurements, which must be acquired during a significant time interval, the vertical resolution also depends on the logging speed and the precision required. | Oilfield Glossary  [Vertical Resolution](https://www.glossary.oilfield.slb.com/Terms/v/vertical_resolution.aspx) |  |
| Wall lining | (In paper link)🙂 |  |  |
| Wavefront | A surface representing the position of a traveling seismic disturbance at a particular time. | AGI  [Wavefront](https://glossary.americangeosciences.org/term/wavefront) |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |