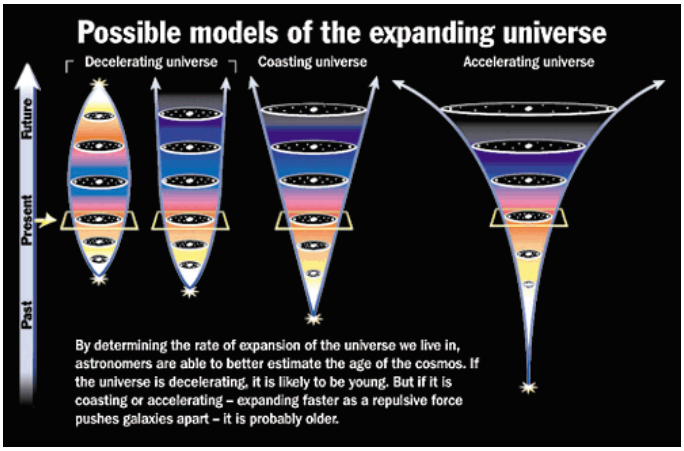
Earth science theories and the water crisis

Introduction

The traditional or classic science about the Earth is that it is in a static or constant state, whereby the Earth's mass, gravity, water volume, etc. are unchanged in time. However, this static Earth theory does consider the Earth surface and upper crust as dynamic due to volcanic and earthquake activity.

On the other hand, there is a theory of the expanding (non-static), dynamic universe.



The cosmological theory of the expanding universe is based on the work of Edwin Hubble. Central to the theory is the interpretation of the color shift in the spectra of all observed galaxies as being the result of the Doppler effect, indicating that the galaxies are moving away from one another.

There is an assumption in this essay that the laws or mode of universal energy (the essence of nature) apply to all points in the universe or cosmos. That is, the energy of gravity, magnetics, electro-magnetics, mass generation, water generation, etc. apply across the universe, to all stars (sun's), planets and moons.

So, why does the universe expand? Perhaps, it is because the **density of universe is small**, so the gravitation force does not have *force to attract* this mass and over time the density will be smaller. Therefore, the gravitation force will become too small to attract this mass and universe will then expand forever. However, while this theory may apply between separate masses in a universe, this theory may not locally apply within and on a mass, eg. the Earth.

When scientists talk about the expanding universe, they mean that it has been growing ever since its beginning in space. The galaxies outside of our own universe are moving away from us, and the ones that are farthest away are moving the fastest. This means that no matter what galaxy you happen to be in, all the other galaxies are moving away from you. However, the galaxies are not moving through space, they are moving in space, because space is also moving. In other words, the universe has no centre; everything is moving away from everything else. If you imagine a grid of space with a galaxy every million light years, after enough time passes this grid will stretch out so that the galaxies are spread to every two million light years.

The universe encompasses everything in existence, from the smallest atom to the largest galaxy; since forming some 13.7 billion years ago it has been expanding and may be infinite in its scope. The part of the universe of which we have knowledge is called the observable universe, the region around Earth from which light has had time to reach us.

Consequently, if the universe expanding then why would the earth not be expanding, as part of the universal energy? Therefore, the purpose of this essay is to highlight the differences in the new, emerging science of the expanding earth, along with changes in earth gravity and mass, and the volume of water on the earth, within and on the earth.

Conventional, theories on static earth science.

Plate tectonics is a scientific theory that explains how major landforms are created as a result of Earth's subterranean movements. The theory, which solidified in the 1960s, transformed the earth sciences by explaining many phenomena, including mountain building events, volcanoes, and earthquakes.

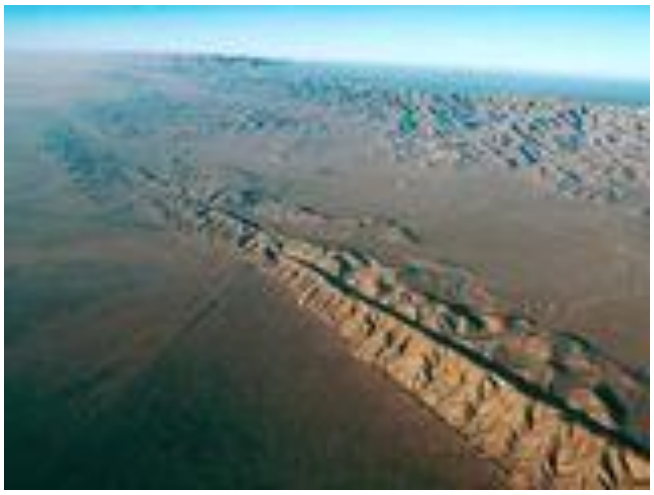
In plate tectonics, Earth's outermost layer, or lithosphere that is made up of the crust and upper mantle, is broken into large rocky plates. These plates lie on top of a partially molten layer of rock called the asthenosphere. Due to the convection of the asthenosphere and lithosphere, the plates move relative to each other at different rates, from 2 to 15 centimeters per year. This theory states that the interaction of tectonic plates is responsible for many different geological formations such as the Himalaya Mountain range in Asia, the East African Rift, and the San Andreas Fault in California, United States.

The idea that continents moved over time had been proposed before the 20th century. However, the scientific community took notice in 1912 when a German scientist named Alfred Wegener published two articles about a concept called continental drift. He suggested that 200 million years ago, a supercontinent he called Pangaea began to break into pieces, its parts moving away from one another. The continents we see today are fragments of that supercontinent. To support his theory, Wegener pointed to matching rock formations and similar fossils in Brazil and West Africa. In addition, South America and Africa looked like they could fit together like puzzle pieces.

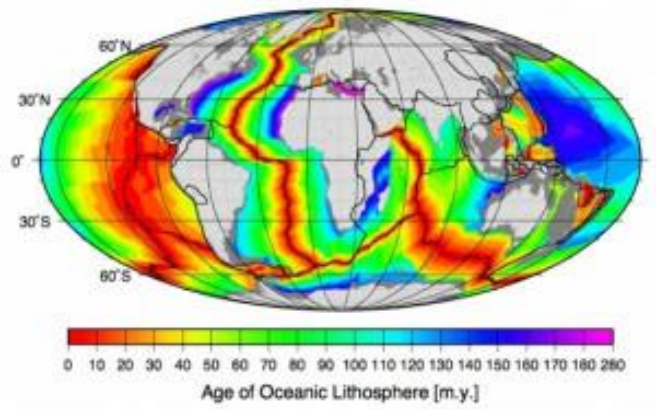
Despite being dismissed at first, the theory gained steam in the 1950s and 1960s as new data began to support the idea of continental drift. Maps of the ocean floor showed a massive undersea mountain range that almost circled the entire Earth. An American geologist named Harry Hess proposed that these ridges were the result of molten rock rising from the asthenosphere. As it came to the surface, the rock cooled, making new crust and spreading the seafloor away from the ridge in a conveyer-belt motion. Millions of years later, the crust would disappear into ocean trenches at places called subduction zones and cycle back into Earth.

Magnetic data from the ocean floor and the relatively young age of oceanic crust supported Hess's hypothesis of seafloor spreading.

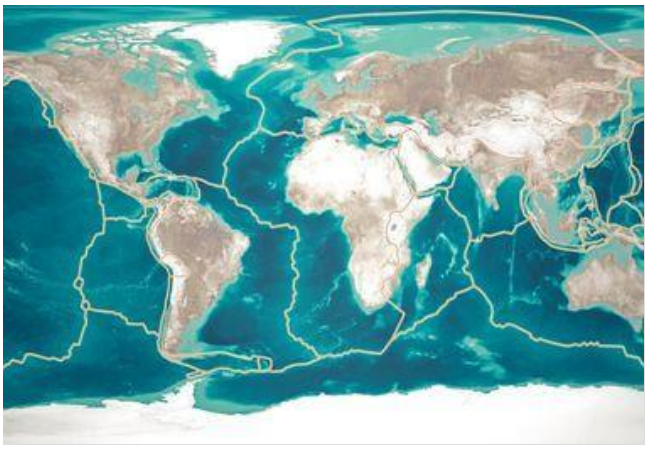
There was one nagging question with the plate tectonics theory: Most volcanoes are found above subduction zones, but some form far away from these plate boundaries. How could this be explained? Consequently, a Canadian geologist, John Tuzo Wilson proposed ion 1963 that volcanic island chains, like the Hawaiian Islands, are created by fixed *hot spots* in the mantle. At those places, magma forces its way upward through the moving plate of the sea floor. As the plate moves over the hot spot, one volcanic island after another is formed. Wilson's explanation gave further support to plate tectonics. Today, the theory is almost universally accepted.



Tectonic plate boundaries, like the San Andreas Fault pictured here, can be the sites of mountain-building events, volcanoes, or valley or rift creation. A scientific idea that was initially ridiculed paved the way for the current theory of plate tectonics, that attempts to explain how Earth's continents move.



In 1977, after decades of collecting and mapping the ocean floor with sonar, scientists began to see a fairly accurate picture of the ocean floor emerged. It was clear that the earth has joints with the youngest material (red in the image on the left) near the joint and stretching out to older materials (orange to yellow to green and blue, as the oldest material.



The Tharp-Heezen map subsequently illustrated the geological features of the ocean floor that then became a crucial factor in the acceptance of the theories of plate tectonics and continental drift. Today, these theories serve as the foundation to explain the geologic processes that shape the static Earth.

Emerging sciences of a dynamic earth

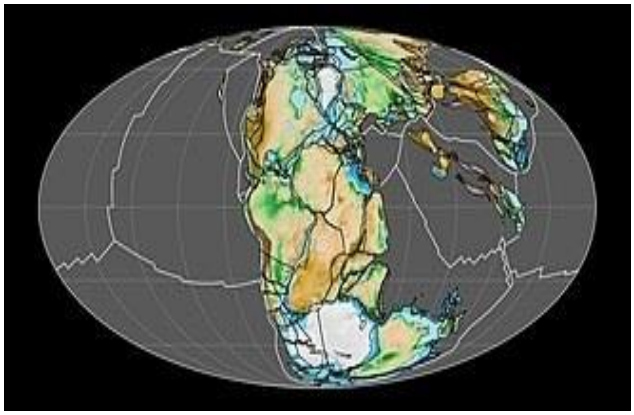
While most Earth scientists and geologist were trying to explain the physics of a static earth, and that continents were just drifting away from each other from an earlier super-continent (Pangea), other scientists were developing the theory of the expanding earth.

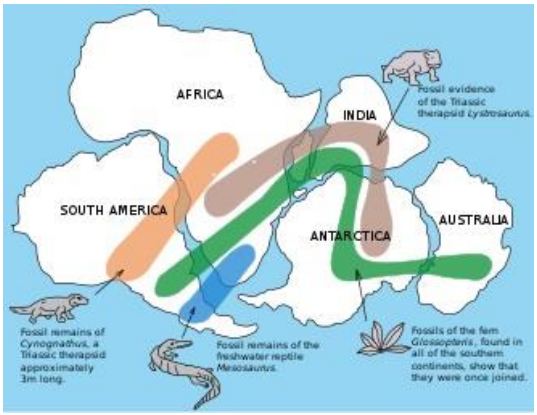
Pangaea existed as a supercontinent for 160 million years, from its assembly around 335 million years ago (Early Carboniferous) to its breakup 175 million years ago (Middle Jurassic). During this interval, important developments in the evolution of life took place. The seas of the Early Carboniferous were dominated by rugose corals, brachiopods, bryozoans, sharks, and the first bony fish. Life on land was dominated by lycopsid forests inhabited by insects and other arthropods and the first tetrapods. By the time Pangaea broke up, in the Middle Jurassic, the seas swarmed with molluscs (particularly ammonites), ichthyosaurs, sharks and rays, and the first ray-finned bony fishes, while life on land was dominated by grasslands, and lush forests of cycads and conifers in which dinosaurs flourished and in which the first true mammals had appeared.

The geography of the continents bordering the Atlantic Ocean was the first evidence suggesting the existence of Pangaea. The seemingly close fit of the coastlines of North and South America with Europe and Africa was remarked on almost as soon as these coasts were charted. The first to suggest that these continents were once joined and later separated may have been Abraham Ortelius in 1596. Careful reconstructions showed that the mismatch at the 500 fathoms (910 meters) contour was less than 130 km, and it was argued that this was much too good to be attributed to chance.

Additional evidence for Pangaea is found in the geology of adjacent continents, including matching geological trends between the eastern coast of South America and the western coast of Africa. The polar ice cap of the Carboniferous Period covered the southern end of Pangaea. Glacial deposits, specifically till, of the same age and structure are found on many separate continents that would have been together in the continent of Pangaea.

Fossil evidence for Pangaea includes the presence of similar and identical species on continents that are now great distances apart. For example, fossils of the therapsid *Lystrosaurus* have been found in South Africa, India and Antarctica, alongside members of the *Glossopteris* flora, whose distribution would have ranged from the polar circle to the equator if the continents had been in their present position; similarly, the freshwater reptile *Mesosaurus* has been found in only localised regions of the coasts of Brazil and West Africa.





Calculations show the improbability of the continents and ocean floor forming exactly the size and shape to reconstruct an Expanding Earth by chance alone. It is similar to arguing that a jigsaw puzzle fits together by chance rather than for any logical reason. The common ground between the two groups of theories, ie. continental drift as opposed to the expanding earth is continents that were once joined share geology, along with common species of animals and plants.

One major unknown about the Expanding Earth theory is the reason why the Earth has expanded. What could possibly cause this massive increase in the size of the Earth? Various people had different suggestions. Professor Jordan suggested in his book, *The Expanding Earth*, that the force of universal gravity might be changing thereby allowing the Earth to expand. Professor Carey preferred new mass being generated within the Earth in his book, *Theories of the Earth, and Universe: A History of Dogma in the Earth Sciences*. Dr Hugh Owen suggested in his book, *Atlas of Continental Displacement, 200 Million Years to the Present: A Test of the Conventional and Expanding Earth Models*, that there was a phase change in the Earth's core that produced a volume change in the Earth while the mass stayed the same.

Therefore, it could be assumed that the ancient earth evolved with water and land mass, whereby the water volume increased due to water generation within the earth (explained later in this essay). This situation would have increased mass pressure on the Earth surface and along with increasing gravity, increasing volcanic and earthquake activity (due to increasing radioactive transmutation of materials in the mantle), could have caused the creation of expansion (pressure or stress) joints across the earth's ocean floor.

However, none of these theories won general favour over the others even amongst the supporters of an Expanding Earth. A change in universal gravity was generally considered the least likely, and the most popular reasons to explain the Expanding Earth were grouped into explanations that allowed the Earth to expand with a constant mass, or were it expanded with an increasing mass. These two major variations of the Expanding Earth theory became known as the Constant Mass Expanding Earth or the Increasing Mass Expanding Earth.

The Earth is not of constant size but is expanding. The Earth's radius is increasing about 2.5cm per year and since 250 million years ago, the earth has approximately doubled in radius size. The rate of growth over that time is exponential and is increasing at an increasing rate. This indicates today a diameter increase of about 5cm per year, a circumference increase of 15 cm/yr, an ocean floor area increases of about 3.8 $m.cm^2$ /yr, a volume increase of about 7,900 $m.cm^3$/yr, and a gain of mass of about 8,000 billion metric tons per year. About 70% of the growth is in the Southern hemisphere and then redistributed around the globe. This would indicate a gravity 250 million years ago of about 50% of today's gravity. While these numbers seem initially unimaginable, the Earth's size is so immense that expansion is nearly undetectable. Therefore, it would take nearly 10 million years at those rates to increase the Earth's radius and circumference by 4%. Hence, the surface area of the Earth would increase 8%, and volume and mass by 12%, in that same time. That is, it is these forces, which contribute to, if not cause, ice ages, earthquakes and super volcanoes, massive lava flows, tsunamis and historic catastrophic disasters and earth shape changes.

Earth mass is being gained and can be proven with Earth studies, and therefore there are other planets and suns now gaining radius and mass. Gravity has been increasing and this would account for the change in the gigantic size of dinosaur size compared to today's smaller sized animals (eg. elephants). That is, dinosaur bone structure would not support a large size due to the increase in gravity and might explain why elephants and giraffes do not have the mobility of a horse.

Some of the best reconstructions available today are on YouTube as short Expanding Earth videos. **Neal Adams'** reconstructions are popular, but the Australian geologist **Dr James Maxlow's** reconstructions also have the added advantage that the geological evidence behind the reconstructions is explained in detail within his books and website (*Dr. James Maxlow Expansion Tectonic*s) that says: *The fundamental difference between plate tectonic theory and what is now known as Expansion Tectonic theory is that plate tectonics insists that the radius of the Earth has remained essentially constant throughout all time. Hence, in plate tectonic theory all gathered global tectonic data is constrained to a constant radius Earth model. In contrast, Expansion Tectonics simply removes this fundamental insistence and allows Earth radius to change with time. The same global tectonic data displayed on an Expansion Tectonic Earth then remains unconstrained from any preconceived assumptions.*

Earth generated water theories.

The emerging science of the expanding earth triggered the **discovery of a massive ocean of water within the Earth since 2000**. However, the ideas about earth generated water have been in scientific literature since the early 1900's. One of the key theories is that Earth generated water is formed deep inside the crystalline rock strata of the Earth's lower crust near the mantle.

These early theories led to the view that this water may have been formed as a residue from volcanoes under the Earth's surface. These eruptions create gases that either escape to the surface as gas or turn into Earth generated water. That is, these gases are electrically and chemically fired into the rock itself and the rock fuses the water out.

Organisms within the crystalline rock structure may also be involved in an electrical and chemical reaction (remembering that marine organisms have been around for about 3 billion years or more and rock eating organisms may have been around for much longer to form oil and gases)

The modern-day theories on Earth generated water were first postulated by **Adolf Nordenskiold** in the nineteenth century and raised in the book **A Journey to the Earth's Interior** by M.B. Gardner (1913). Nordenskiold wrote an essay about Earth generated water which resulted in him being nominated for the Nobel Prize in physics.

In the 1930's, **Stephan Riess**, Bavarian-born mining engineer and geologist had a theory that Earth generated water was generated in the rock strata when the right temperature and pressure were present. This water is then forced into fractures/fissures in the rock where the water transverses over 100's of km. Some of this water is sometimes expressed as springs and can be either hot (thermal) or cool (17 C). This water is always moving and therefore can be detected by dowsing.

The first experience with Earth generated water for Reiss was an unexpected gush of water while working in a mine shaft. The temperature, chemistry and purity suggested to Riess that it must have a completely different origin than ordinary ground water considered part of the hydrologic cycle. Following further independent research, and building on the work of other eminent geologists, he concluded that in various rock strata, deep in the earth, water was continually generated under conditions of temperature and pressure and forced up in rock A reservoir of water three times the volume of all the oceans has been discovered deep beneath the Earth's surface. The finding could help explain where Earth's seas came from fissures where it could be drilled for and tapped. Reiss called this water, ***Primary Water***.

William Rubey (1898-1974: Prof. University of California) showed that magna was about 4% water and igneous rocks are 1% water, then the magna had given off 3% of the water during crystallisation and would account for the entire volume of the ocean. He then estimated that if flows from thermal springs over a period of 3 billion years are included then that volume would be 100 times the volume of the ocean. Rubey produced credible evidence that the Earth is

dynamic and not a constant. Consequently, the question was, is *plutonic water* tied up in the Earth's crust?

There are similar theories about Earth generated oil and gas. Again, Prof. Lance Endersbee's book (*A Journey of Discovery*) outlined the work of **Demtri Mendeleev** (1834-1907) and Prof. **Thomas Gold** (1920-2004). Gold described how it was possible for biological synthesis of petroleum to occur in deep rocks by bacteria feeding on the methane in the groundwater rising from the interior of the Earth. It is known that when oil is extracted from about 2.5km into the Earth's core, water is present with the oil. Oil is perpetual and the idea of *fossil fuels* is a flawed theory.

In 2014 reports were published (*Steven Jacobsen of Northwestern University in Evanston, Illinois*) about water hidden inside a blue rock called ringwoodite that lies 700 kilometres underground in the mantle, the layer of hot rock between Earth's surface and its core.

The huge size of the reservoir throws new light on the origin of Earth's water. While many geologists think water arrived in comets as they struck the planet this new discovery supports an alternative idea that the oceans gradually oozed out of the interior of the early Earth.

Jacobsen's team used 2000 seismometers to study the seismic waves generated by more than 500 earthquakes. These waves move throughout Earth's interior, including the core, and can be detected at the surface. The speed of the waves are measured at different depths, and in this way the team could figure out which types of rocks the waves were passing through the earth. The *water layer* revealed itself because the waves slowed down (dampened), as it takes them longer to get through soggy rock than dry rock.

Jacobsen worked out in advance what would happen to the waves if water-containing ringwoodite was present. He grew ringwoodite in his lab, and exposed samples of it to massive pressures and temperatures matching those at 700 kilometres down. Sure enough, they found signs of wet ringwoodite in the transition zone 700 kilometres down, which divides the upper and lower regions of the mantle. At that depth, the pressures and temperatures are right to squeeze the water out of the ringwoodite. Jacobsen concluded that rocks release water along the boundaries between the rock grains, almost as if they are *sweating*.

The volume of the Earth's oceans is approximately **1.3 × 10 9 km 3, or 1.332 billion cubic kilometers**. The largest of the oceans is the Pacific Ocean followed by Atlantic, Indian and Arctic Ocean. Given their sheer volume, 99 percent of the living space on the planet is found in the oceans. However, estimates of the water within the Earth's mantle and crust range from **3.996 billion (assuming cubic kilometers** (ie. 1% of the available space in the water zone of the mantle and crust) to **59.94 billion cubic kilometers** (ie. 15% of the available space in the water zone of the mantle and crust).

The tragedy of the Earth's water commons

The idea that there this **more water under the surface of the Earth than in the oceans** has not been grasp by most public scientists and academics, who are stuck in a belief that the hydrological cycle provides all of the available fresh water, as a recycling process. Consequently, water management policy by governments is based this belief and this is why irrigation practices are largely located around floodplains and major river systems. This limitation in water science thinking has led to massive inequities in water allocation where water is now a tradable commodity and eventually water ownership ends up in the hands of a few rich corporations and investment funds. This restriction of water ownership has also caused water shortages in towns and villages that previously relied on rivers for water supply. The economic viability of small farm operations and aboriginal communities has become threatened due to water allocation restrictions, and this leads to progressive land ownership concentrations in large corporations and investment funds.

To a large extent, increasing **economic rationalism emerged as a consequence of scientific paralysis**. In the 1950s, when modern academic research began to take shape, science was still a rarefied pastime. The entire club of scientists numbered a few hundred thousand. As their ranks have swelled, scientists have since lost their taste for self-policing and quality control. The obligation for *peer review* and to *publish or perish* has come to rule academic life. Also, in the early 1970's large corporations began funding public science agencies and the universities, and from that time on science became wedded to corporate profit motives and scientists became reliant on delivering work to satisfy corporate objectives. The consequence was a loss of objectivity, innovation, and creative thinking. This is why, scientific papers are now more likely to exclude inconvenient data from results due to the motives of corporations, and more recently politicians, who want to justify corporate or policy directions. Therefore, as more research teams from around the world work on water supply and quality issue, the odds shorten, to them falling prey to an honest **confusion between genuine discovery and corporate or political noise. Corporate and political economic objectives are now intertwined,** and consequently scientific advancement has lost momentum; and this is not helped by the concentration of press or media ownership in a few large corporations**. Messaging to people then becomes a one-way street to promote corporate objectives.**

The messaging in public science, government agencies and the press about a water crisis is nothing more that corporate hype to control water resources, including water supply, storage, and use for corporate objectives. The messaging is a one-way-street that has nothing to do with the common community interests in water security and water integrity (quality) for all people. Corporations, science agencies, press and governments, are an interlocking set of commercial arrangements who feed off, and support each other in a reinforcing manner. These organisations leverage public monies for credibility, private profit, and asset (eg. water) control.

However, people need to know that **we do not have a crisis in water security**, **we have a crisis in public science, corporate and government rhetoric**, **as a smoke screen for corporate greed**.

Earth water source and perpetual supply.

There are many examples of Earth generated water that flows out of the Earth's crust:

Waterfalls and springs emerge on or near the tops of mountains all over the world. Most people would not give a second thought to how the water got to this position and in such volumes. Clearly, this water volume is not rainfall runoff. This water is produced deep within the Earth and is pushed up under pressure to the surface through fissures. This water is the primeval water under constant production within the Earth.

This is a thermal occurrence within a river in Peru in the Amazonian River system and the hot water that emerges in the river is a fault-fed hot spring from the *Earth's arteries* that are filled with hot water that comes to the surface as geothermal manifestations. This water is heated up by Earth's geothermal energy from deep within the Earth.

A hydrothermal vent is a fissure on the seafloor from which geothermally heated water from deep within the Earth that pores out, similar to a geothermal vent or waterfall on the land surface.

Rotorua region's geothermal water is a continuous source of heated water from deep within the Earth. The hot geothermal waters are hailed for their healing properties and as cures for ailments such as sexual impotence, arthritis, and rheumatism.

The existence of these continuous flows of water from the Earth cannot be linked to the hydrological cycle because their occurrence or location are from underground vents or fissures that are not recycling rainwater. However, public scientists do use this rainwater cycling theory to explain these waters. Moreover, the sea levels have been continuously rising over time due to the continuous production of water within the Earth. Scientists explain these rises away as the consequences of climate change, albeit that climate change has always been a continuous process on Earth.

Expansion of earth ocean water volumes

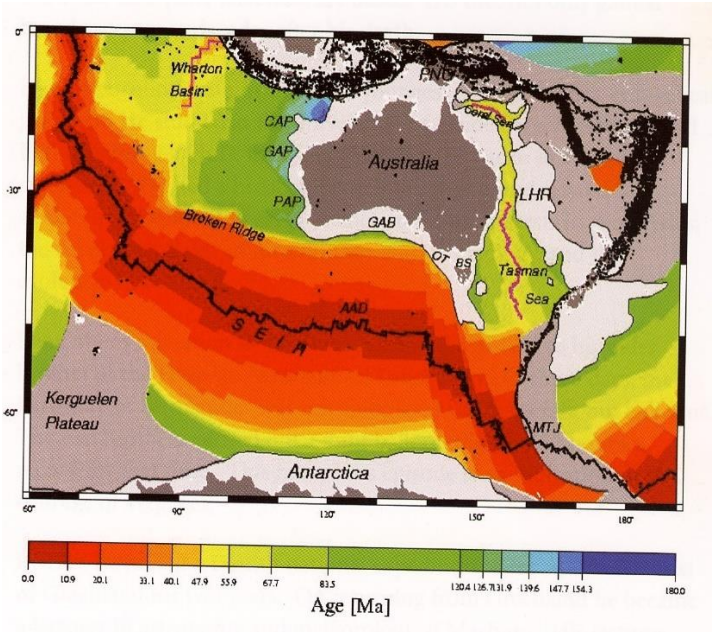
As outlined earlier in this essay, water is made within the Earth and this process has been continuous for perhaps billions of years. That is earth water volumes are expanding, primarily in the ocean, albeit that surface soil volumes are diminishing due to human impacts with agriculture and vegetation removal. Most agricultural areas had increasing soil dryness deficits since the early 1900's.

There is geological evidence that helps constrain the time frame for liquid water existing on Earth. For example, a sample of pillow basalt (a type of rock formed during an underwater eruption) was recovered from the Isua Greenstone Belt and provides evidence that water existed on Earth 3.8 billion years ago. In the Nuvvuagittuq Greenstone Belt, Quebec, Canada, rocks dated at 3.8 billion years old by one study and 4.28 billion years old by another show evidence of the presence of water at these ages. If oceans existed earlier than this, any geological evidence either has yet to be discovered or has since been destroyed by geological processes like crustal recycling. More recently, in August 2020, researchers reported that sufficient water to fill the oceans may have always been on the Earth since the beginning of the planet's formation.

Unlike rocks, minerals called zircons are highly resistant to weathering and geological processes and so are used to understand conditions on the early Earth. Mineralogical evidence from zircons has shown that liquid water and an atmosphere must have existed 4.404 ± 0.008 billion years ago, very soon after the formation of Earth. This presents somewhat of a paradox, as the cool early Earth hypothesis suggests temperatures were cold enough to freeze water between about 4.4 billion and 4.0 billion years ago. Other studies of zircons found in Australian Hadean rock point to the existence of plate tectonics as early as 4 billion years ago. If true, that implies that rather than a hot, molten surface and an atmosphere full of carbon dioxide, early Earth's surface was much as it is today.

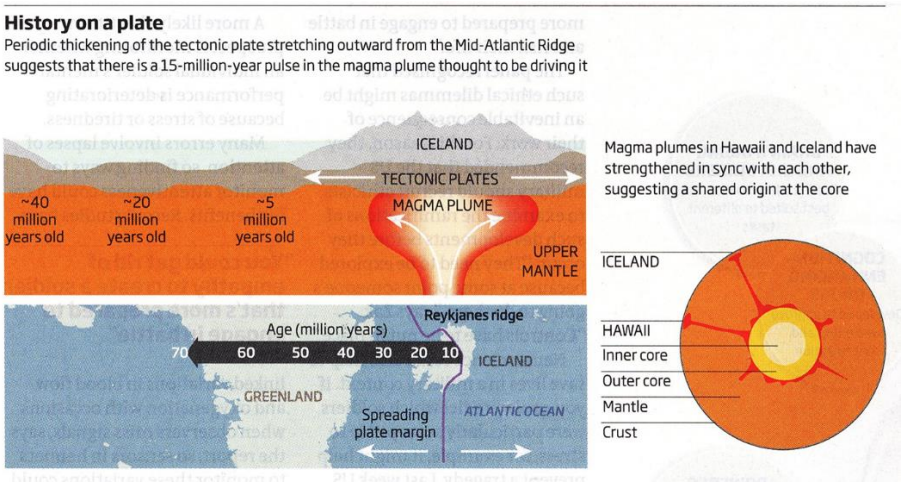
While the majority of Earth's surface is covered by oceans, those oceans make up just a small fraction of the mass of the planet. The mass of Earth's oceans is estimated to be **1.3 × 10 9 km 3, or 1.332 billion cubic kilometers** which is about 0.023% of the total mass of Earth. An additional 5 times the volume of the surface water is estimated to exist in ice, lakes, rivers, groundwater, and atmospheric water vapor. A significant amount of water is also stored in Earth's crust, mantle, and core. Unlike molecular H_2O that is found on the surface, water in the

interior exists primarily in hydrated minerals or as trace amounts of hydrogen bonded to oxygen atoms in anhydrous minerals. Similarly, the Earth's mantle and crust could contain 5-15 times the oceans' worth of hydrogen.



The expansion joints that cross the earth oceans are a major exit points, as thermal plumes, for earth water. These water are mineral and biologically rich. Water from within the earth also vents from geysers and springs on the land. While some of the seabed vents may be recycling seawater most of this water is from the earth generated water source. Albeit, that current theories are that seabed vent water is all recycled seawater.

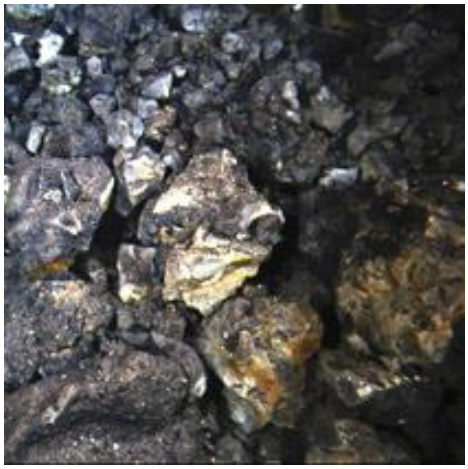
Earth and its continents may have been shifting over the last 2.5 billion years. This new timeline is contrary to previous studies that said it emerged only 700 million years ago, and it could impact models used to understand how Earth has changed over time. The large-scale motion of parts of Earth's crust, and dictates how continents drift apart and come back together. It helps to explain where volcanoes and earthquakes occur, predict cycles of erosion and how life on Earth has evolved.



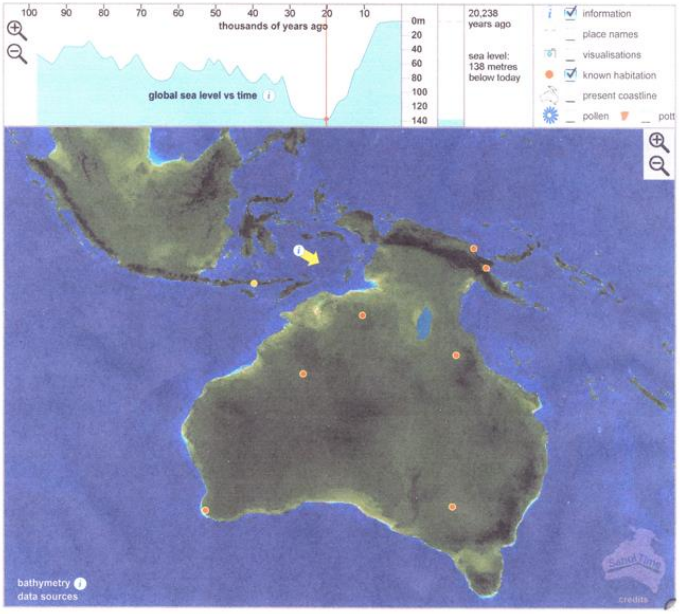
Because the earth is expanding the land masses stretching away from each other, this process strongly influences the pathways and flow of earth water to the surface, over the past 2.5 billion years.

Chunks of broken sea floor rock, and large-grain pyroclastic deposits cover an outer slope of the Oden volcano on the seabed floor near the North Pole. There is an 1,800-kilometre-long ridge, which cuts across the Arctic from Greenland to Siberia. It is one of the planet's **spreading ridges**

where molten rock and earth generated water rises up from inside the earth creating new crust. See images below.



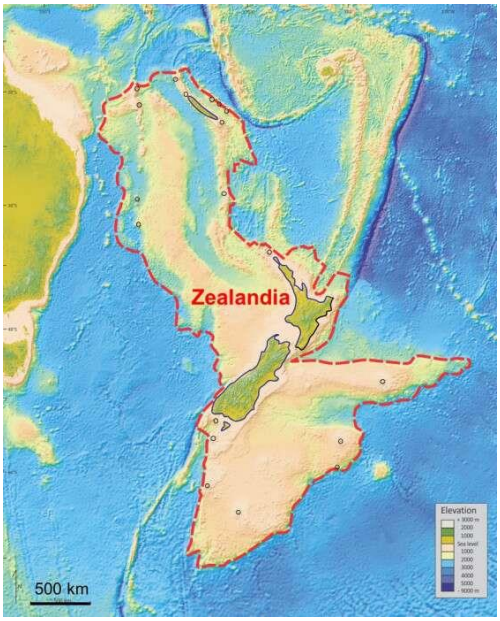
Now, imagine if we could turn back time and view Australia's ancient past. What would we see? During the Ice Age, sea levels were much lower than today's levels, and Australia and PNG were connected as a single continent. Also, Tasmania was linked by a land bridge across what is now Bass Strait. However, what explains the sudden rise in sea levels during the last 20,000 years? Where did this extra water come from to create a rise-up to 140m? Is this water created within the Earth?



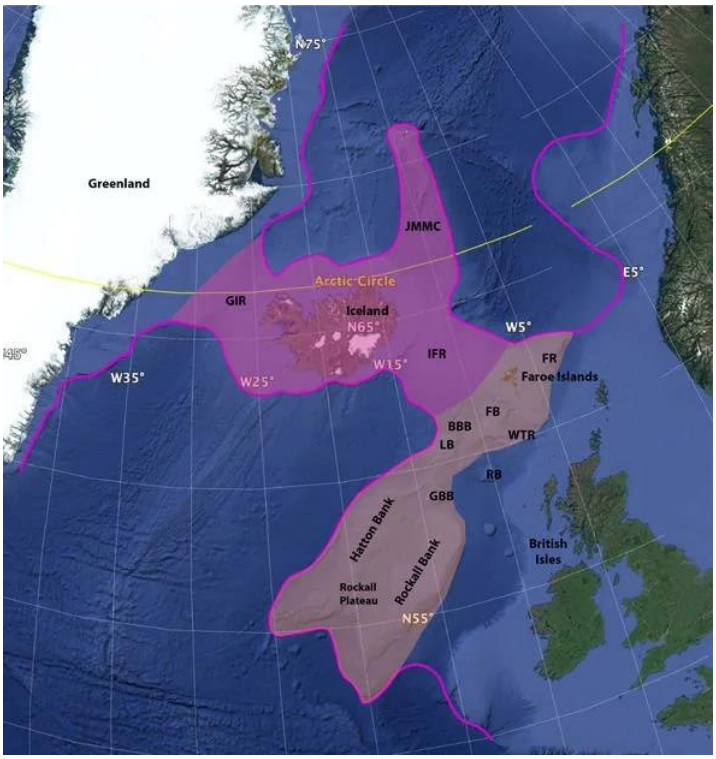
Years ago (1000's)	Sea level rise (m)
17-20	20
11-10.5	24
10.9.5	28
5-1	6

Fairbanks, 1989

Sea levels have risen naturally by about 80 metres over the past 18, 000 years and the during the current warming period. Consequently human (aboriginal) habitation and culture that once survived about 6000 years ago on the continental shelf (30km from the current coastline) is now submersed (ie. artifacts and drawings in caves). Therefore, all species on the Earth have always had to adjust or adapt to rising sea levels.



An underwater continent two-thirds the size of Australia, has been mapped and they are calling it ***Zealandia*.** This ancient continent is about 2.8 million square kilometres in size and 94 percent submerged. But at its highest points, it protrudes above the ocean surface in the form of New Zealand and New Caledonia. While the temptation might be to say *Zealandia* has sunk into the ocean, it is likely evidence of rising seawater levels due to Earth generated water reaching surface through seafloor plumes and land-based springs. Albeit, that this continent may have partly subsided into a massive gas void within the crust. Clearly, there are crustal events resulting from earth expansion activity that cause continental changes.



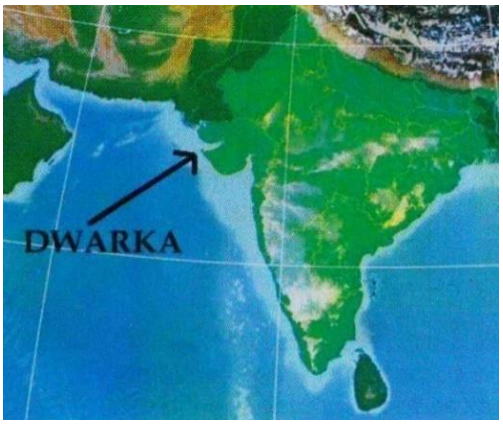
Similarly, an international team of geologists believes they have identified a sunken continent hidden under Iceland and the surrounding ocean, which they called ***Icelandia*** (see image above). This ancient continent could stretch from Greenland all the way to Europe. If proven, this new theory will challenge all previous theories around the extent of continental and oceanic crust in the North Atlantic region, as well as contradict the belief that Pangea broke up, and drifted (ie. continental drift theory) more than 50 million years ago.

Icelandia may comprise blocks of full-thickness (40km and seven times thicker than normal oceanic crust) continental lithosphere or extended, magma-inflated continental layers that form a hybrid continental-oceanic lithosphere. It underlies the Greenland-Iceland-Faroe Ridge and the Jan Mayen microplate complex, covering an area of ~600,000 km2. It is contiguous with the Faroe Plateau and known parts of the submarine continental rifted margin or expansion joint offshore from Britain. If these are included in a *Greater Icelandia*, the entire area is ~1,000,000 km^2 in size.

The super large thickness of thee crust also supports the idea of the existence of an ancient super continent, and the role of volcanic activity providing the materials to reinforce thickness, possibly along the Earth seabed expansion joint near and through Iceland. However, the fact that most of this ancient continent is now covered by water, leaving Iceland and Greenland as islands, reinforces the theory of the expanding ***Earth Generated Water*** that is continuously burying the Earth land mass.

A report in Australia's Sun Herald, dated 9 Sep 2007 (below) showed an image of aboriginal paintings in a cave, around Port Hacking (near Sydney) that were 80m below sea level. This cave would have been an Aboriginal rock shelter, and they would have been fishing on the continental shelf about 40-60,000 ago. This rise in seawater across the land mass is significant.

Also, there is buried infrastructure under the sea of past civilisations. The buried city of Dwaraka (see image below), once a state of India, had a population of about 39,000 and existed as a seaport more than 9,000 years ago. The city was swamped by the sea, about 3,500 BCE.



Redefining earth water systems

The Australian Academy of Science defines groundwater as the water that exists underground. While it can be present as underground lakes beneath the Earth's surface, it is more common that the water lies in the tiny spaces between grains of sand or bits of fractured rock. It is a bit like the effect you would get if you poured water into a jar of sand or pebbles, the water would not float to the top, but instead would settle in the spaces between grains, filling the spaces between sands or stones. That is, groundwater is considered by the Academy to be all water below the surface of the land. The problem with this definition is that soil water processes (say within metres of the surface) are quite different to water confined within a crystalline rock structure that might be 300-500m below the land surface.

Water on or near the Earth's surface can be defined as follows:

- **Atmospheric water** is water vapour that comprises about 60% of atmospheric gasses.
- **Seawater** is water confined to the oceans or seas and represents the major component of water on the Earth surface.
- **Land surface water** is tied up in ice, dams, rivers or creeks, wetlands, ponds, etc. and often the most readily available water for drinking or reservoir storage. This water is a major part of run-off to surface reservoirs or flows and evaporation to the atmosphere.
- **Soil water** is all water within the soil system and confined between the upper most layer of soil (ie. the A horizon) and the uppermost clay layer (ie. soil C horizon) or rock strata. Most soil water is either transpired by plants or finds its way through lateral flows to the surface reservoirs or flows, eg. ponds, wells, creeks, and rivers, etc. About 2% of soil water finds its way to the groundwater. Soil water is also the main salt transport system associated with salinity and this process is driven by soil health degradation (see papers at ***http://www.eric.com.au/html/papers_salinity.php***)
- **Groundwater** is mainly water confined below the soil water between clay layers (aquitards in depositional systems) or rock strata in aquifers or fissures. This water can include buried rivers (paleo-channels, often at 100m deep) and unconfined aquifers that express water at the surface (ie. springs). Groundwater is the major source of water for bores. **Groundwater is not the source of salinity** as promoted by public science agencies.
- **Earth generated water** is created within the Earth's crust or mantle and found in the crystalline rock system often at depths greater than 300 metres (about 1,000 feet). This water is the source of all water on the Earth and eventually reaches the groundwater, soil water and surface through vents and unconfined aquifers. Therefore, this water can eventually become part of the hydrological cycle once extracted or when it finds its way naturally to the surface. Earth generated water is also known as *primary water, juvenile water, and proton water*.

The hydrological cycle primarily involves atmospheric, surface and soil waters. Groundwater is replenished mainly from Earth generated water (a variable rate based on flows within fissures, pressures, depth from surface, bore extractions, etc.) and 2% from surface or soil waters. The amount of Earth generated water available is unknown and not part of any public water

accounting system, or public science theories. However, this Earth generated water source is potentially massive and significant in water access and usage terms.

That is, the earth generated water is currently a massively under-utilised water reservoir that can be access (drilled) using drilling-rigs with a capacity to drill to 600m. Once this water is mapped, and the bore located, the water supply can be 50-250,000 litres per hour. The water head in these deep groundwater sources can be just 10's of metres from the surface due to water pressure at these 300-600 deeps.

Deep groundwater mapping and bore location services.

Phi'on (www.primalwater.com.au) developed unique techniques in deep groundwater mapping and bore location services in the mid 1990's. Phi'on clients have choices that are guided by a Phi'on consultant based on airborne data coverage for the area, the size of the property and groundwater needs for the client's enterprise. Once the maps are produced by **Phi'on** the client will be sent copies of the maps by email. These maps will be further used **onsite to brief the client and to guide the field work to locate the groundwater bores** (see images below).

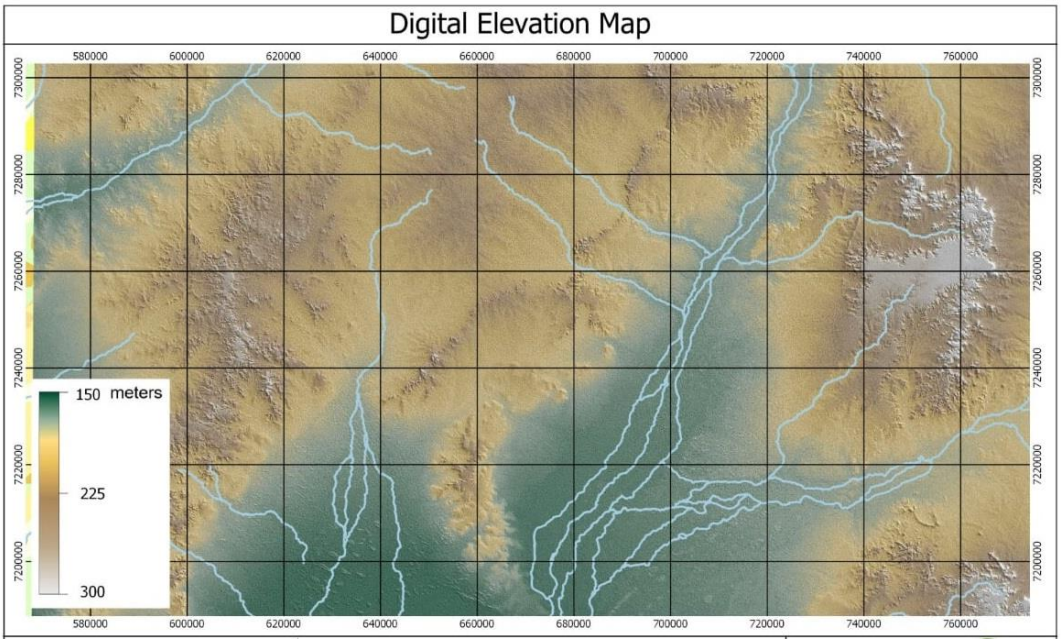
Once a bore is located, the bore site is pegged. A report covering the map and field analyses is then prepared for the client.

The bore site report details:

- Estimated depth of groundwater inflows.
- Estimated amount of groundwater for each inflow.
- Estimated quality of groundwater from pump depth.
- Map analysis report.
- Site analysis (including any photographs).
- Location of all bores sited for future drilling.

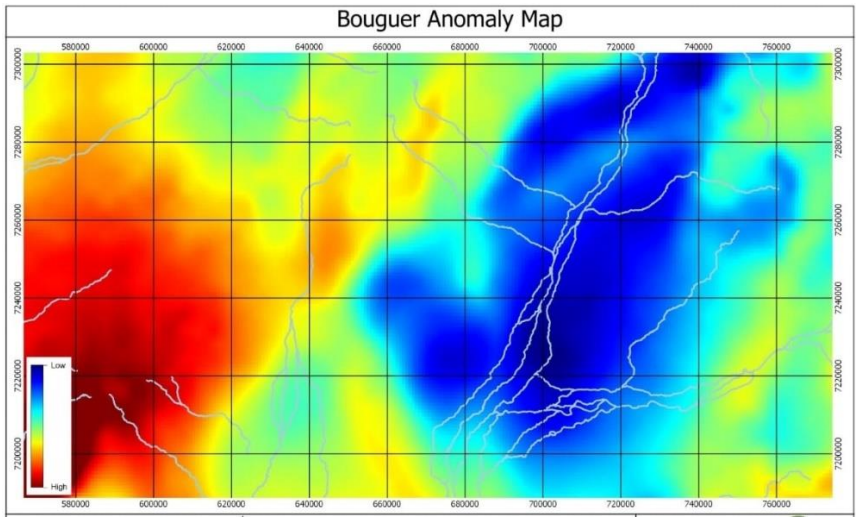
Outlined on the flowing pages are the range of maps that are used to detect potential deep groundwater sources.

Digital elevation map (DEM)



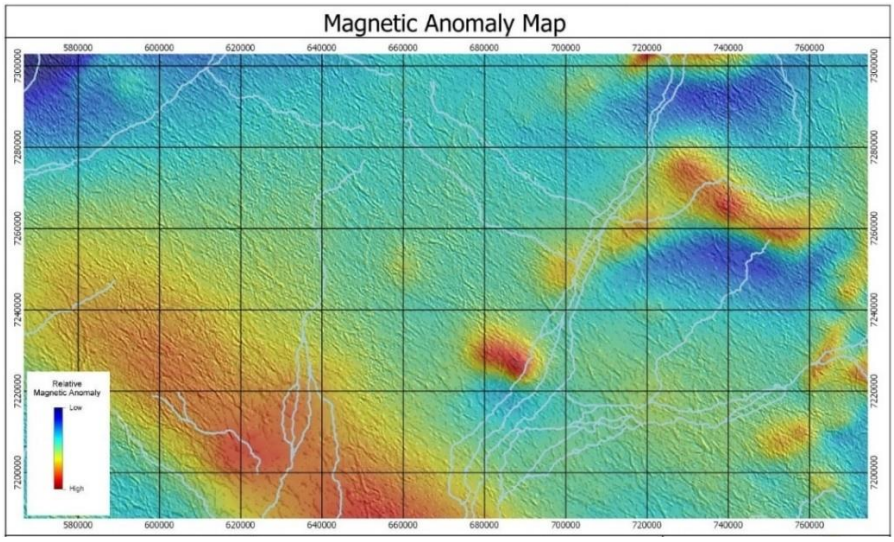
The terrain, ie. the form of ridges and valleys, can be a reasonable indicator of rock fracturing, including the direction and extent of fracturing, and rock deformation. This digital elevation map (DEM) can also be used to define the direction of the surficial drainage system (eg. creeks and rivers), catchment boundaries slope and aspect. This map is also used to guide borehole access, specifically in steep terrain areas.

Gravity



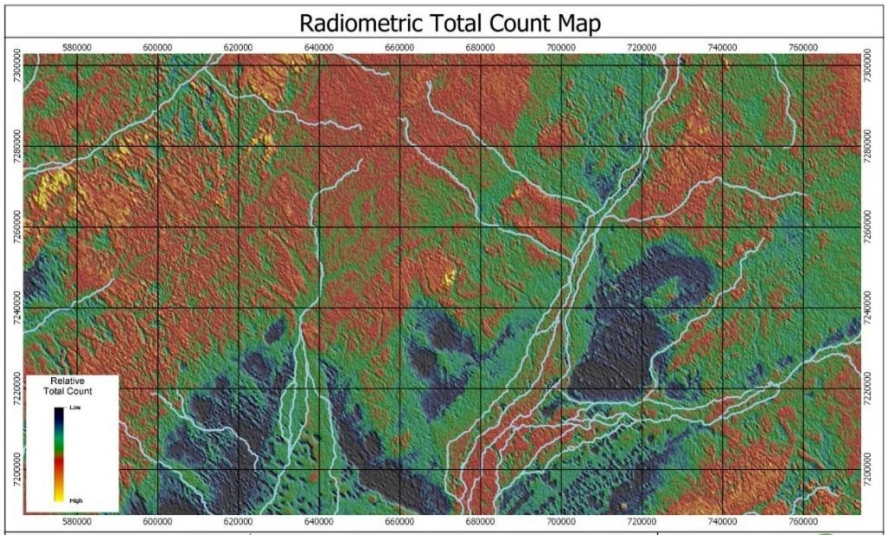
Gravity is the force of attraction between masses. The airborne gravity data used in this image are coarse, however the data provides another level of discrimination for the location of deep groundwater sources. The areas of most interest are the **low gravity values (blue)** which can be indicators of **deep groundwater** basins, sinks or confined groundwater sources.

Magnetics



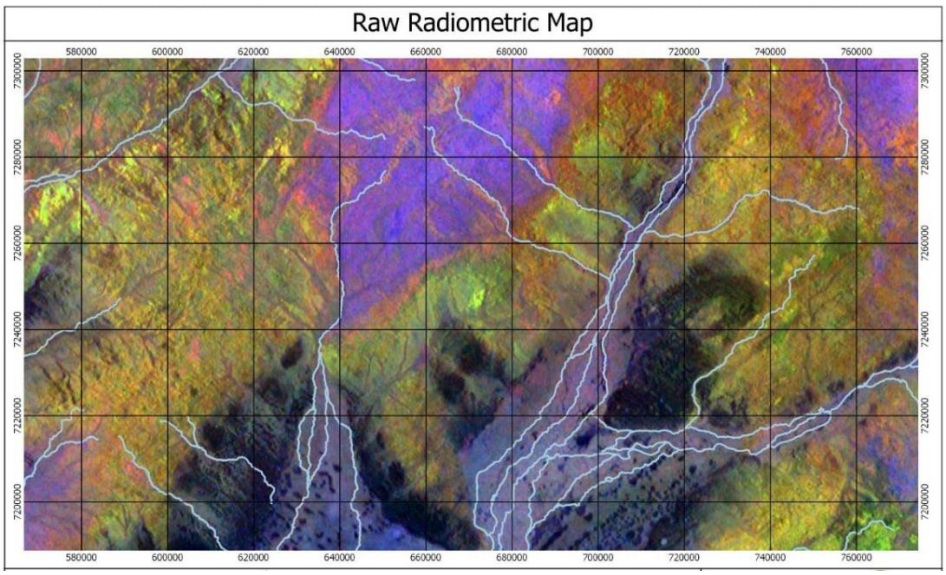
The airborne magnetics provide the variation in magnetic emissions from the Earth. Magnetic images in this report have high magnetic susceptibility as red and low susceptibility as deep blue patterns. The **deep blue** represents potential groundwater sources or highly weathered rock materials and water in these materials dampens the signal to produce **low magnetic values**. These images provide the best indicator of deep groundwater resources.

Radiometric total count of gamma ray



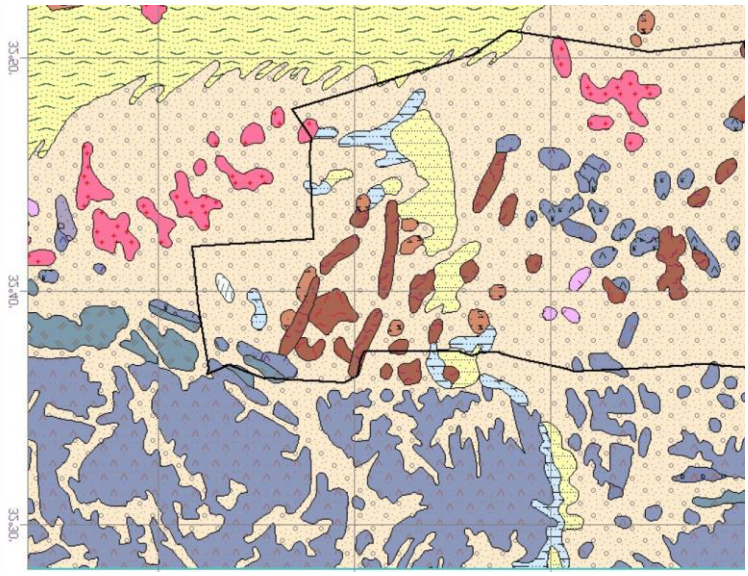
The radiometrics are derived from airborne gamma-ray data emissions that are the breakdown of radionuclides, such as Uranium, Thorium and Potassium. The Uranium radionuclide is the source of radon gas that can be high on granite soils and in saline pathways. Radon hotspots are in red. The radiometrics (as a total count of gamma-ray) are used to define shallow water sources or saturated soils that are often associated **with low gamma-ray emissions, as seen by the deep blue** in the above image.

Radiometric composite



This radiometric composite image highlights the variation between Uranium (purple and bright yellow), Thorium (greenish yellow) and Potassium (black)

Geology

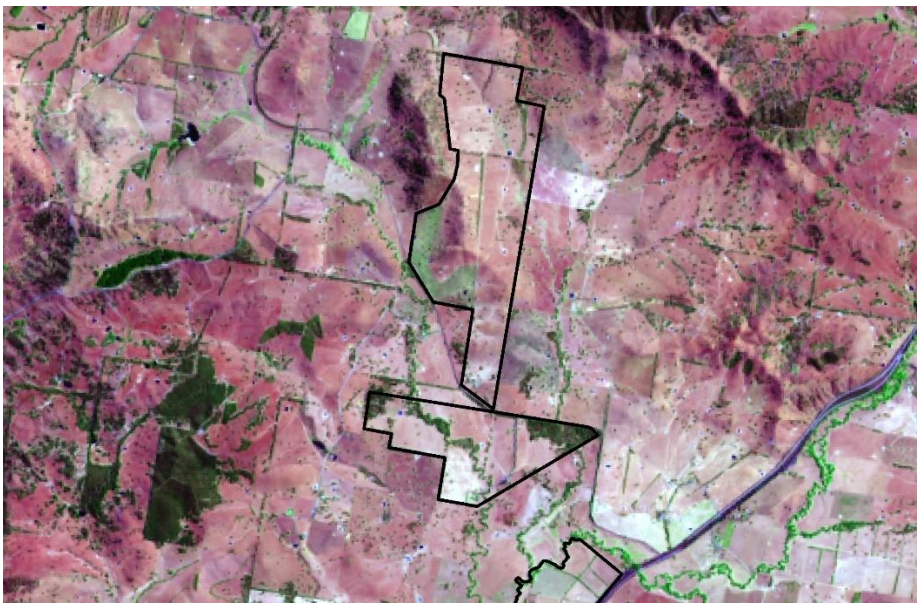


The geology of an area provides a fundamental base for assessment of the rock system, the nature of the rock type (eg. igneous, sedimentary, or metamorphic) and the extent of rock deformation or fracturing. Geology has both spatial and time dimensions that form the dynamics or complexity of the groundwater assessment.

Aerial

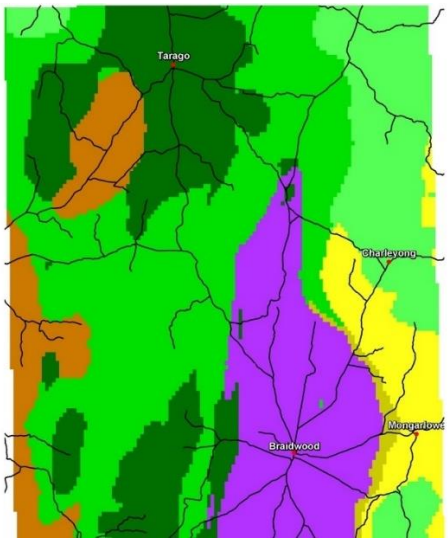
The aerial photo provides the fine resolution of land use, infrastructure (eg. buildings, dams, fence lines, trees, and roads/tracks) that are necessary for field navigation to the bore hole.

Satellite (False colour)



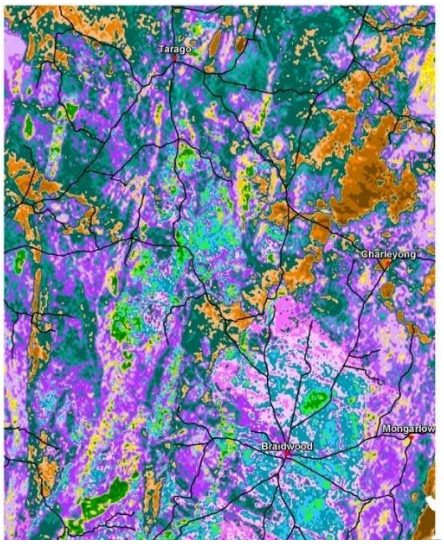
The satellite data are included to provide the land cover types (eg. vegetation, crop, bare ground, riverine vegetation, etc.) in the study area.

Magnetic and Gravity Classification

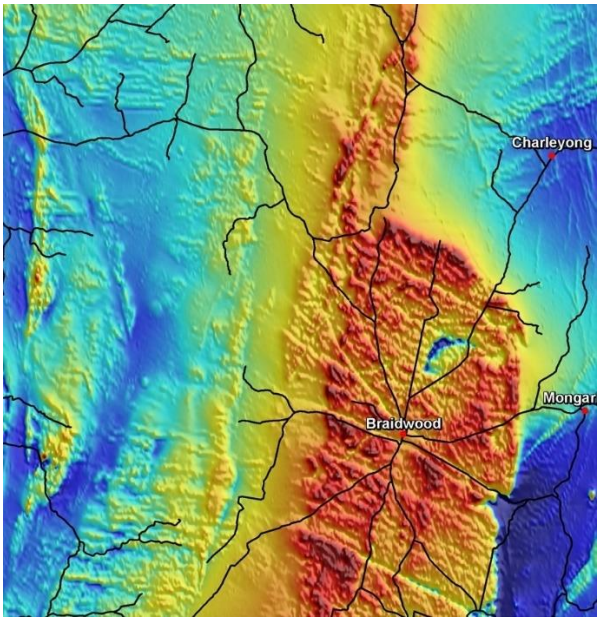


This data set is a composite of gravity and magnetic data that are classified to determine spatial patterns that represent the correlations (spectral and spatial), highlighting potential areas for deep groundwater exploration at local scales.

Radiometric classification



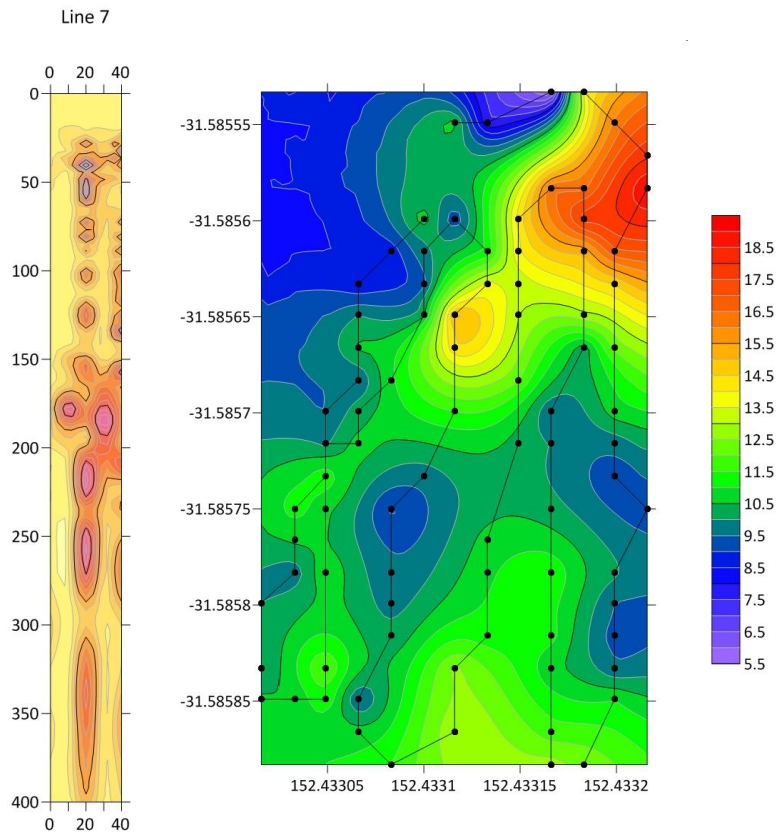
The radiometric classification of the total count (TC) provides fine details of the soil property differences, salinity pathways, surficial rock structures, and generally is a good guide to shallow groundwater expressions or buried paleochannels.



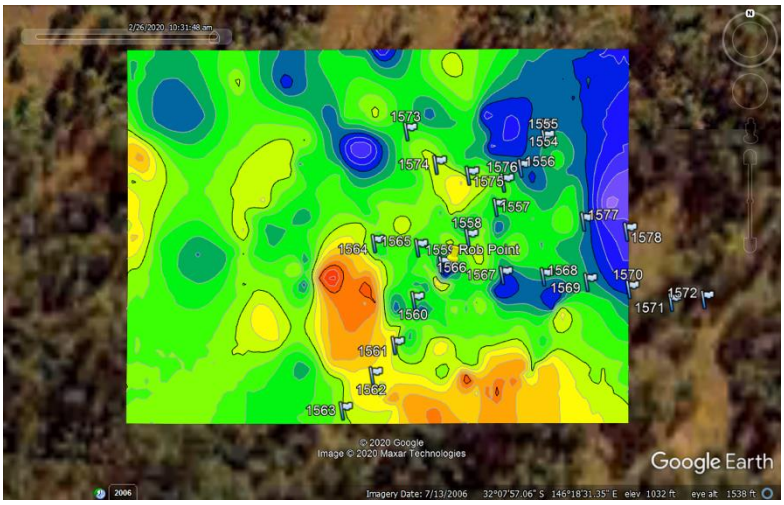
The integration of the magnetic, gravity, radiometric and map classifications described above, provide a based at a paddock scale to site a bore. Ground-based techniques, including field observation of geology and vegetation provide clues to suitable sites. Also, rock fracture systems are located using dowsing/divining, along with ground-based seismic and gamma technology.

The major fracture systems are clearly visible in the image to the left. However, at a paddock scale, the field-based techniques and technologies are necessary to pinpoint the best bore hole site.

Onsite Seismic and Gamma ray



This **Passive Seismic (RAP) output service** is **optional** and can be undertaken after bore sites have been located. The Seismic is a ground-based technology, utilised to map the profile of the fractures below a bore site. This is technology will confirm the depths and possible volumes of water for each of the rock-fracture zones (water-bearing weaknesses) and mapped within metres of depth.



Radiometric (gamma-ray) survey will be conducted to further narrow down specific points of interest in the identified groundwater sites. These data are collected real time using a customised gamma-ray scintillation counter calibrated for water search. This technology assists in differentiating a dry fracture system from a wet fracture (water bearing)

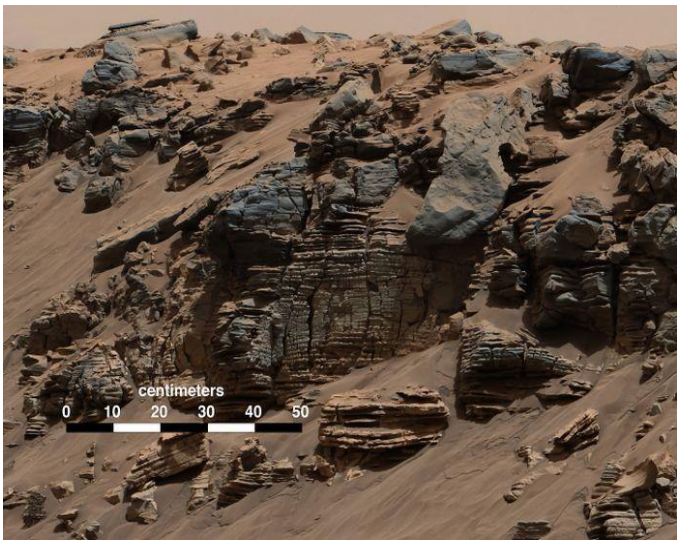
Water may naturally occur as rocky planets form.

There is mounting evidence from space exploration that water may have been present in the universe before Earth was formed and certainly that all planets and moons in our galaxy would have generated their own water.

It is unlikely there ever was a Big Bang that formed the universe, but rather the universe started with a wimp of energy forming mass that this process evolved over time to form the universe as we know today, and this universe is expanding along with the planets and moons. A case in point is Mars and it starts with an ancient Martian meteorite that carries with it some compelling implications.

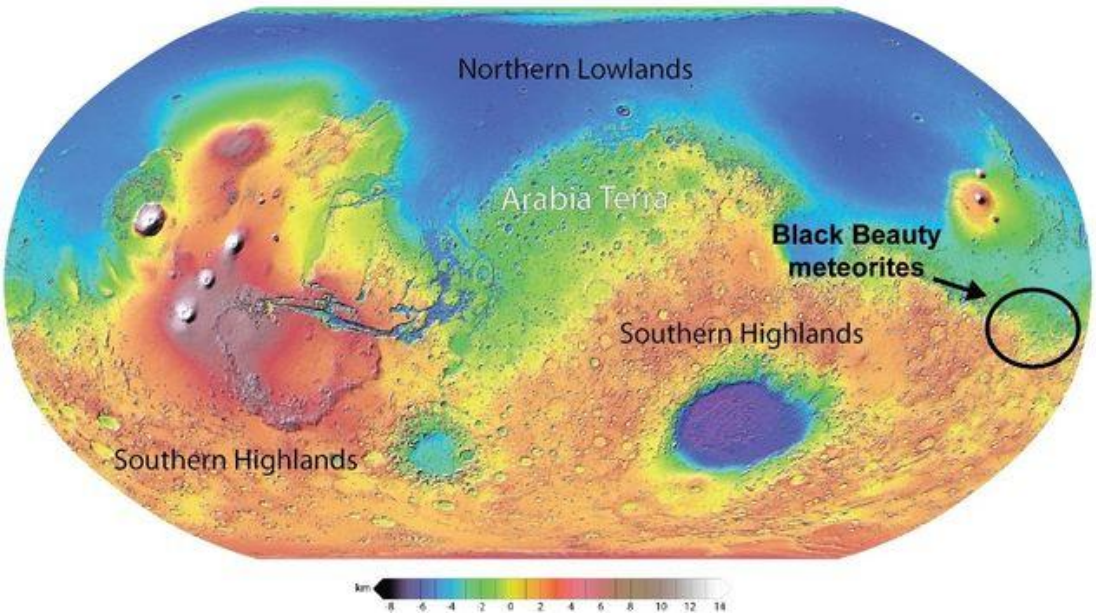
- The meteorite behind the new research, *Black Beauty*, is 4.45 billion years old. This means it is from right around the time when Mars formed.
- It contained intact, ancient water-bearing minerals.
- The research indicates later asteroid-impact effects that could only have occurred if water were already present.

There has been a theory since about the 1950's that about 1 in 100 of our water molecules came not from asteroids but from hydrogen in Earth's core, a remnant of dissolved gas from solar nebulae. Now, a study of a Martian meteorite suggests that most water may not come from space at all, but that it is a **natural byproduct of rocky-planet formation**. This could mean water is everywhere, which would greatly increase the chances of extraterrestrial life. This research is based on a meteorite from Mars called *Black Beauty* that was found in the Moroccan desert. Black Beauty is 4.45 billion years old and comes from the Martian crust, providing a rare window into the early days of Mars and the solar system.



The image to the left is of Lake-floor sedimentary deposits on Mars (Credit: NASA/JPL-Caltech/MSSS) Black Beauty indicates that liquid water was present on Mars in the first 90 million years after it was formed. To deduce this, the researchers had to crush and dissolve 15 expensive grams of the meteorite for analysis. "It suggests that water emerged with the formation of Mars. And it tells us that water may be naturally occurring on planets and does not require an external source like water-rich asteroids.

Supporting this research were signs of asteroid impacts that resulted in the release of a great deal of oxygen, something the scientists say could only have occurred if water was present. The impact, Black Beauty reveals, created kinetic energy that released a lot of oxygen. And the only mechanism that could likely have caused the release of such large amounts of oxygen is the presence of water.



Credit: University of Copenhagen

The analysis may also provide an answer to one of the lingering mysteries of Mars: How could such a cold planet have accommodated the water for the lake and river remnants we see there today, as shown above? Black Beauty bears indications that early asteroid impacts released a significant amount of greenhouse gases that warmed the now-chilly orb for a time. This means that the CO_2-rich atmosphere may have caused temperatures to rise and thus allowed liquid water to exist at the surface of Mars.

Certainly, it could be concluded from this evidence that water has existed on Mars from its earlier formation, and it may have been there for at least 90 million years. Also, there may have been life on Mars as *life* is dependent on water, albeit that the mechanism for the emergence of life is a mystery. Nevertheless, researchers agree that water is a precondition for life, and they now know that planets and moons can form their own water. I respect of the Earth, and as explained in this essay, there is strong evidence that the Earth had water and the first cell emerged in water and then evolved to form multicellular organism. The oldest known single-cell organism on Earth is about 3.5 billion years old.

However, we know more about certain distant galaxies than we do about what lies kilometres (km) beneath our feet. For that reason, Soviet scientists in the 1970s decided to probe deeper than humanity has ever done before. For the next 24 years, they drilled on and off into the Earth's crust.

The result was the Kola Superdeep Borehole and a drill-depth of more than 7.5 miles (12 kilometers). To put that in perspective, Kola descends further than the deepest point of the ocean, which lies at 12.6 kilometers). The borehole is located on the Kola Peninsula of Russia.

However, did we learn anything from these decades of drilling into the Earth's crust? **Scientists found microscopic fossils of single-celled organisms at 7.6 kilometers down, and at nearly the same depth, they discovered water**. They also found that the temperature at the bottom of the hole reached a blistering 180°C with rocks dated at 2.6 billion years, and because this was too hot, drilling was officially halted in 1994.

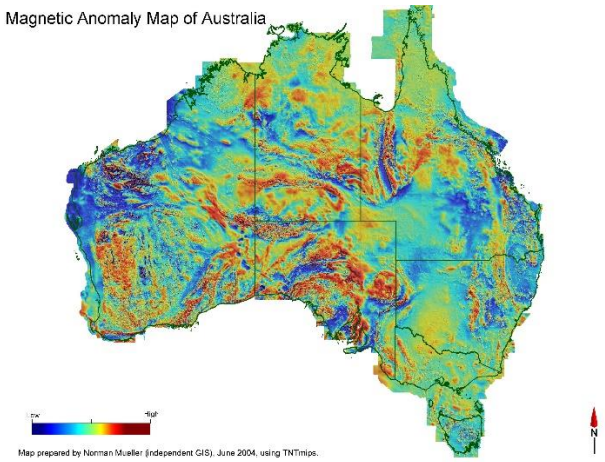
However, what's even more impressive is that scientists estimate that the distance to the center of the Earth is nearly 6,400 kilometers, and therefore a drill hole to 12.6 km barely reveals the nature or make-up of the crust that is probably 40-50 km thick.

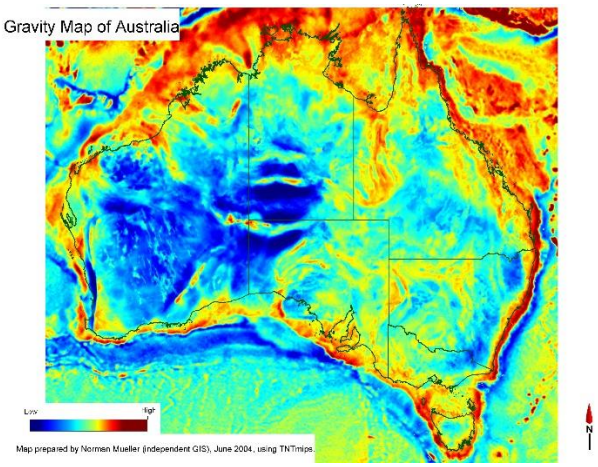
Case for a national deep groundwater exploration policy

Water formation in the Earth is not as most people think of it: It is neither liquid nor in the form of water molecules, the H_2O. Instead, the hydrogen and oxygen atoms that form water are stored separately in certain minerals within Earth's deep interior. Under certain circumstances, those atoms will recombine to form liquid water. Therefore, if we look at how much water any rock can store, it is a super tiny amount and a fraction of a fraction of a percent. However, the Earth mantle is huge or about two-thirds of the Earth's mass, and this mass is increasing due to Earth expansion processes. Consequently, if you have a fraction of a fraction of a percent times two-thirds of the entire planet, then it is a significant amount of deep groundwater tied up in the Earth's crust and it is a new water resource for to cycle through land-based uses. Earth's mantle goes down to about 750 kilometers, and therefore about an ocean's worth of water (at least) can be stored in that depth.

That is, the mantle is part of the Earth's water cycle. However, most public scientists and government bureaucrats learned at school or in earth sciences at university that the water cycle is solely the process of evaporation, condensation, and precipitation. Therefore, it is time to rewrite the earth sciences textbooks and add the radioactive transmutation and geochemical processes that occur within the Earth's mantle to the water cycle.

Deep groundwater sources are extensive across Australia. No one would be more than a few kilometres from a deep groundwater supply source, and in some areas, there are massive deep groundwater supplies. Below (left) is the Magnetic map for Australia and the Gravity Map (right) for Australia. The blue areas in the Magnetic Map (ie. dark to light blue zones of low emissions) shows potential major concentrations of deep groundwater sources that could be accessible in the zone of 200-300m deep. The blue (low emissions) areas in the Gravity map show potential areas of major concentrations of deep groundwater sources beyond 300m. Access to this deep groundwater is enhanced in the areas where there is both high potential in the magnetic and gravity maps.





The utilisation of these deep groundwater sources across Australia, and other countries, would massively change most economic, social, and environmental issues that currently limit the wellbeing of all species on this planet.

The major changes would be:

- Fresh, mineralised water would be easily accessible to local communities and businesses, and not controlled by large water supply corporations, and the concentration of water trading rights in the hands of a few super investment corporations would be avoided.
- Water supplies would be uncontaminated and not affected by drought restrictions.
- Irrigation could be moved from the vulnerable floodplain systems to areas of large, deep water supply. This change in land use would significantly improve river flows, river ecology, and water quality within surface water systems.
- The days of transporting water over long distances would be over.
- The diversity and distribution of food production and associated business would be massively improved across a wide range of land.
- Greater water equity distribution across all communities, whereby down-stream communities are not deprived of water from upstream overuse and greed.
- Drought would no longer cause economic, social, and ecological dislocation along riverine systems.

Phi'on uses a combination of geophysical mapping, field observation and divining/dowsing to locate shallow groundwater sources, and the earth generated, deep groundwater bore sites. Sources of high volume, deep groundwater can be mapped through the integration (classification) of the magnetic and gravity data. This technique has developed by Phi'on scientists in the mid 1990's and successfully applied across Australia since that time.

Earth generated water supplies are already providing huge volumes to many cities and small urban/village areas around the world and these sources continue to flow at the same rates over centuries/decades, eg. Beirut's water supply comes from bores in the mountains, west of

Lebanon and similarly water is provided to Damascus through continuously flowing bores. Also, many towns in Australia (eg. Bega in NSW) use bore water from deep aquifers (fractured rock sources) for drinking water.

Earth generated water as fractured rock water is potentially the greatest source of sustainable water supply for Australia. However, this does not suggest that this water can be pumped at higher rates than can be sustained by pressure that moderates the flow rates. All groundwater or Earth generated water bores need to be assessed for sustainable flow rates (a rate that has no draw down, or the draw down level from the water head is recovered prior to further pumping).

The shallow groundwater system, along with surface supplies from rivers/ dams, floodplains, etc. is at greatest threat from over exploitation by large, corporate food and fibre producers, at the expense of other water users, and river ecology requirements. However, this shallow groundwater water should be preserved for river ecology and river community use, and the deep Earth generated water assigned for cities, large towns, **all irrigation**, and large industry users (eg. agriculture, feedlots, viticulture, horticulture, other intensive farming, etc.).

Equally, dams are a major disruptor of surface water flows and hence the ecosystems of these flows. Besides, the cost of a major dam system for town supply can be in the order of 10 times greater than the cost of bores to deliver the same volume of water. Dams are not drought proof while deep groundwater bores can be configured to provide continuous supplies of water during a drought. However, major water infrastructure projects (eg. dams and large pipelines) are preferred by politicians and engineers because they leverage favors and cashflow for corporations. Collectively, they are responsible for ongoing, **surface water ecocide**.

Current surface water sources are extensively over exploited, while **earth generated water is the major fresh waters source** that currently under-exploited for human and animal consumption, and it is sustainable. This is why there is a need for major government policy direction on water access (particularly on private land), and land use practices to maximise water and food security for all Australian communities.

The Australian Constitution, Section 100, says: *Nor abridge right to use water. The Commonwealth shall not, by any law or regulation of **trade or commerce**, abridge the right of a State or of the **residents** therein to the **reasonable use** of the waters of rivers for conservation or irrigation*. Therefore, **water is a common good** and should not be regulated and traded by governments in a manner that concentrates most benefit in the hands of large corporations. However, when the Constitution was written, it did not include the deep groundwater system, because at that point in time, the existence of this water was inconceivable. That is, this water did not exist in the minds of government scientists, let alone the idea that water was generated in the Earth. Also, the increase and over exploitation of floodplain, shallow groundwater by large corporations could not have been foreshadowed. However, the intent of this Section 100 of the Constitution is that the water is a common good and there is a right of access to all who need the water for life and enterprise. Also, with the growing corporate concentration of water ownership, aided and abetted by politicians, we are witnessing a modern-day ***tragedy of the commons***.

Conclusion

Australia is in a water security crisis for two main reasons:

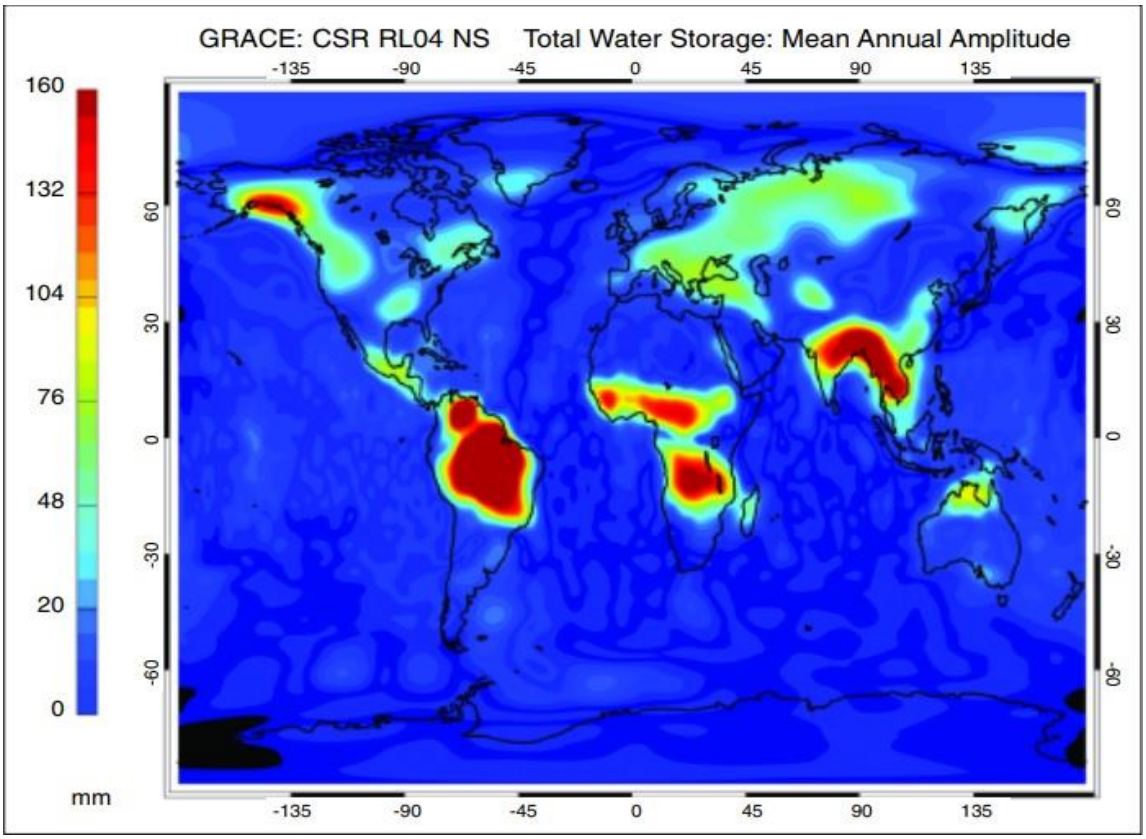
1. The orthodox dogma of hydrological science contains falsities about the origins of water on the Earth and the existence of a continuously increasing supply of deep groundwater.
2. The boundaries placed on science through the controlling peer review system that constrains scientific thinking to belief systems, and militates against new ideas, innovation, and thinking outside of the peer review doctrine.

The great Australian Earth Scientists like Prof. Lance Endersbee and Prof S. Warren Carey faced the same dogma and peer review constraints when they tackled the *public science establishment* with new ideas about the Expanding Earth and Earth Generated Water in the period from the 1950s-2000. When Carey died in 2002 and Endersbee in 2009, the Earth Sciences *establishment* in Australia nosedived back 80 years (pre- 1950's thinking). Academia and public science agencies have buried the great vision that Carey and Endersbee had for advancing Earth Sciences out of the dogma of peer review, and the hydrological falsities about Earth water and Earth expansion.

Carey's book ***Theories of the Earth and Universe***, and Endersbee's book ***A Journey to Discovery***, should be essential reading for any aspiring Earth Scientist. Carey and Endersbee often shared their research ideas, and Endersbee drew significant energy from the early work of Carey. It was through their courage and tireless research, they played a leading role in destroying the myth of the static Earth and Earth water sources, and by their example encouraged other scientists to speak-up and take a stand against Earth science dogma. In the big scheme of Earth science history, their endeavors truly mattered, and achieved immortality through his ideas, and the unique spirit that motivated them.

However, while science advisors to politicians are stuck in a pre-1950's dogma of Earth dynamics there is unlikely to be any movement soon towards a national policy on water security that involves exploiting the deep groundwater systems, that are massive in Australia and critical to Australia's future food and energy (hydrogen) security position. That is, Australia is expecting water security with 1950's thinking by public scientists, bureaucrats and politicians.

However, Australia is in a unique position to exploit, yet not over utilise the deep groundwater system, and to drought proof Australian food production and thereby increase community wellbeing and prosperity. Compared with the global shallow groundwater situation, Australia has a relatively small variation in its shallow water supply (see NASA map below).



The shallow groundwater system that is relatively at risk is in the far north of Australia, and probably reflects the periodic dry rainfall period of shallow water supply. Importantly, this means that the planned use of this area for cotton production, and using river water supply, is foolhardy in the absence of utilising deep groundwater sources. Such new projects are another Murry-Darling Basin disaster, waiting to happen in 20-30 years' time. That is, when politicians rely on existing groundwater dogma, the same water *security* disasters will be occur.