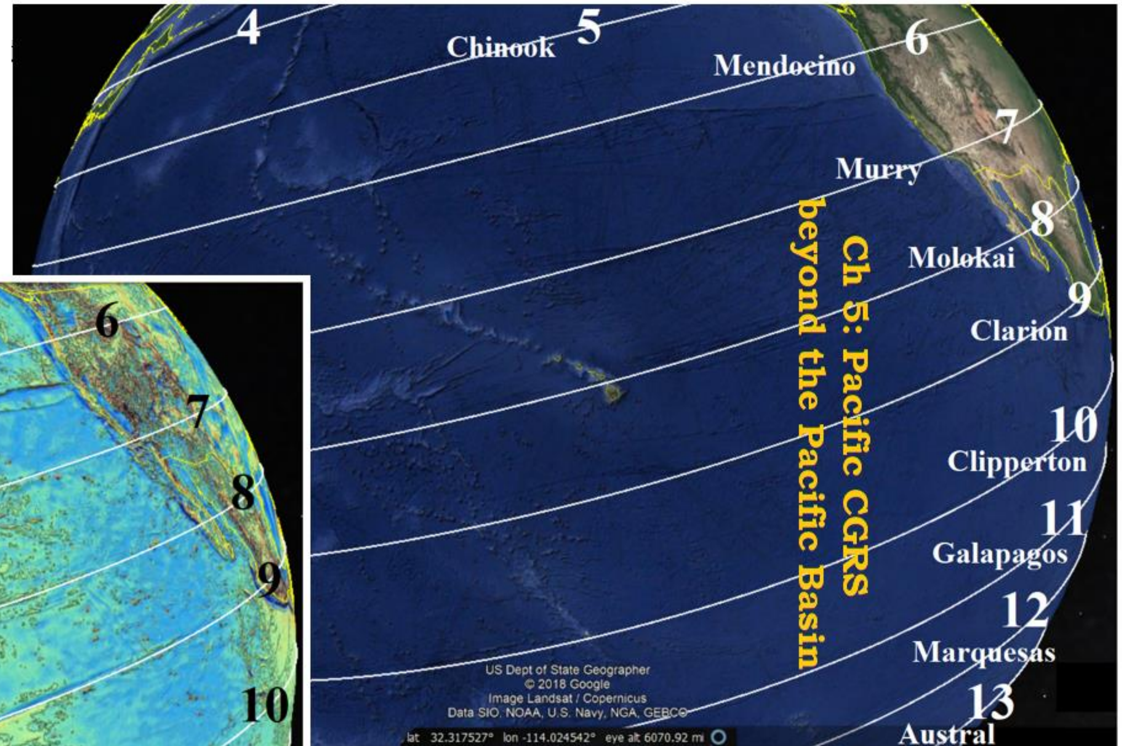
This section is included as a photo essay to help the reader see, with the author, that the Pacific CGRS can be traced all the way around the globe. We also want to better understand how Global Gravity Anomaly is helping us to identify linears. Images are produced in as large a format as possible to reveal more details.



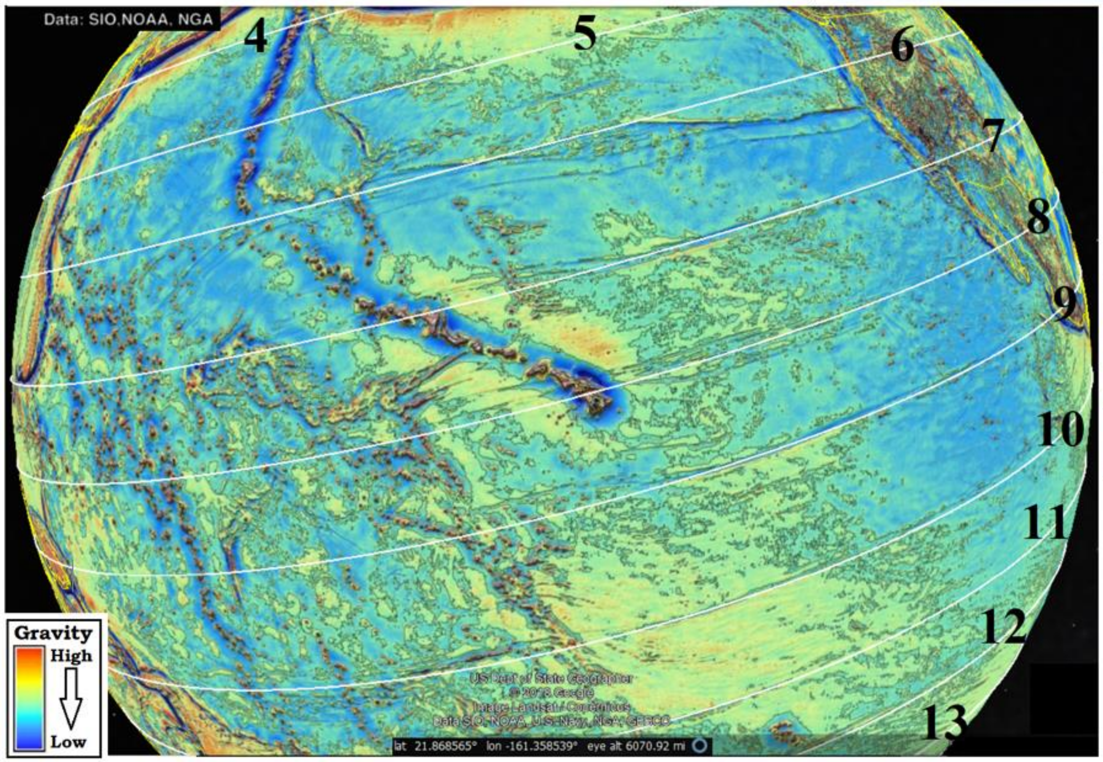


Figure 5.1: Google Earth view of the central Pacific Ocean giving the numbered CGRS and their Fracture Zone names. Landsat view above, Global Gravity Anomaly (GGA) view to left. GGA shows much variation in the ocean floor. Many of these changes form linears that can be traced a myriad of directions. Some, we can assume, like the island chains, are reflected in topographic variation if we could see them. (2015, accessed 21 April 2018.)

Global Gravity Anomaly (GGA) maps (Scripps 2014) provides a gravity portrait of the Earth. Red indicates higher density rocks and blue indicates lower density. The minerals may be different or just arranged in a more or less dense arrangement. (There is some indication for both.) The major chain of islands crossing from upper left and ending in mid Pacific is the Emperor and Hawaiian Chains. They appear here, not by their greater elevation, but their greater density within a trough of blue, lower density lithology. While volcanic basalt would support the greater density and thus elevated gravity reading, it does not provide any justification for the containing trough of low density. A release-wave valley (Barnhart 2017) may provide that explanation.

Global Extent of Pacific CGRS

The remainder of the images in this chapter traces some of the Pacific CGRS around the globe, showing that the lineaments of shock and release-waves are global. Their concentric occurrence connects all of them to the same source of shear and genesis.

Where Pacific 6 diverges from the Mendocino FZ

Figure 5.2, shows Pacific 6 where it diverges from the Mendocino Fracture Zone at the most northern red arrow. This linear transition conforms to Gay's (2012) statement that lineaments are sometimes composed of multiple fractures/ linears that meet at square corners. Meeting at corners suggest the fractures/ linears relate to different centers. Here the red arrows indicate portions which turns south towards California and following a CGRS centered nearer the North Pole.

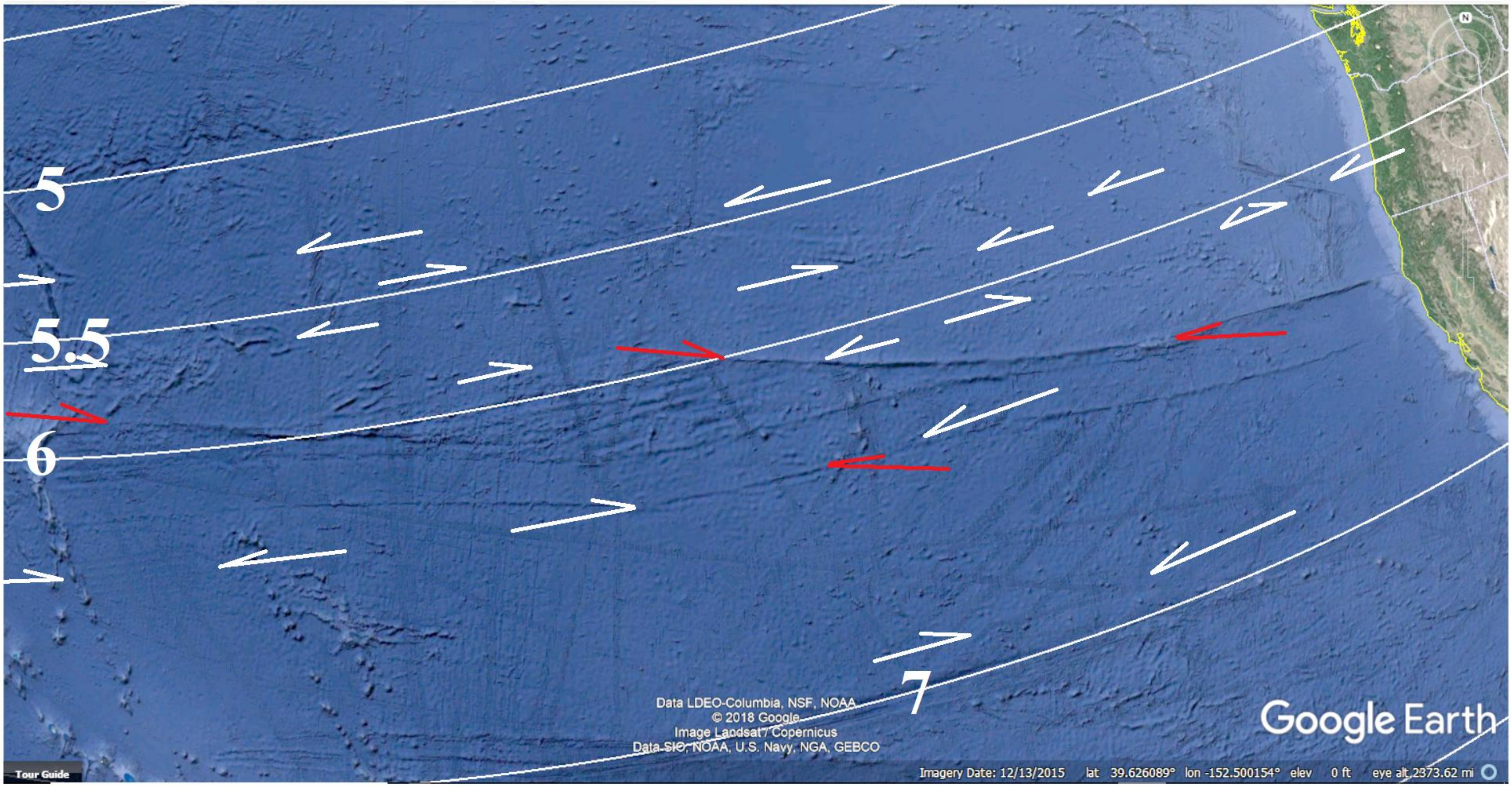
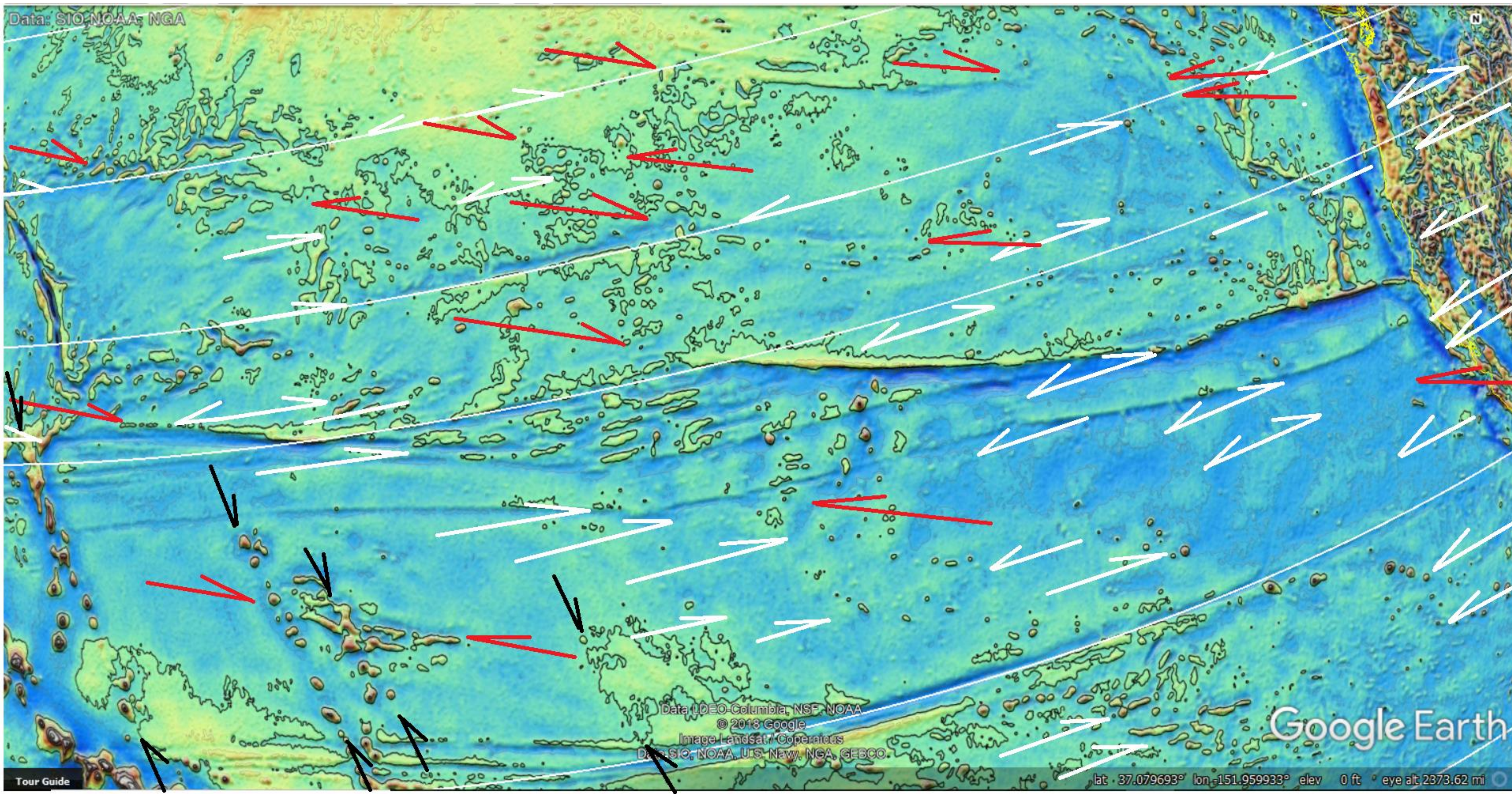


Figure 5.2: Google Earth (color modified removing part of the dark blue Google Earth adds to oceans) of the North Pacific showing plotted route of Pacific CGRS. Route of the Mendocino Fracture Zone diverges from the Pacific CGRS 6 at upper red arrows. (Accessed 4/21/2018.)

While some linears from this North Pole center, red arrows, are visible in Landsat, more are visible in the Figure 5.3, gravity map. One explanation of denser sea floor is a predominance of basalt which is denser than granite on the land. If this denser occurrence is because of basalt, maybe its occurrence is localized and reflects inadequate exploration, and it does not cover the entire sea floor.

Figure 5.3: GGA map of the same area as Figure 5.2 showing the gravity profile image of the North Pacific Ocean. (Accessed 4/21/2018.)



Pairs of white arrows in the above two images point out linears that are concentric to the lines drawn through the fracture zones. Red arrows indicate linears from North Pole center. Black arrows indicate a third center. There are many more linears than the few labelled as fracture zones. Every concentric linear is traced back to the same center, and thus shares their genesis. As the same linears appear on both maps they indicate both a bathymetric imprint and a lithologic one.

I do think this gravity image of the sea floor does establish the fact of linears and the multiplicity of concentric ridges. What is an alternative explanation? They are not transverse, tearing faults like the San Andreas. There are way too many for an involvement in plate motion, and plate motion does not explain the up and down character consistently seen. Cratering does provide an explanation. Now we need to see if it is an internally consistent explanation.

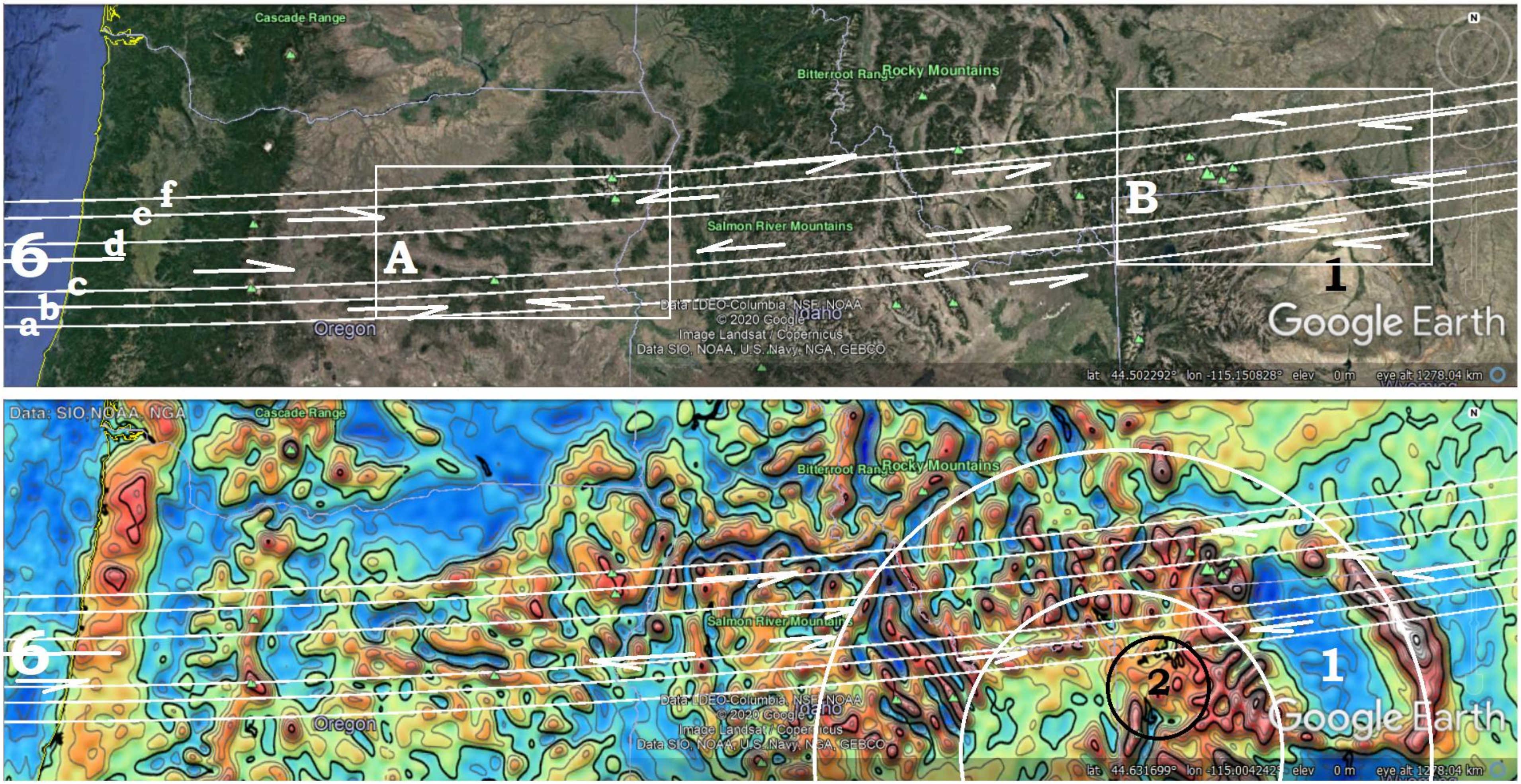


Figure 5.4: Google Earth, upper, and GGA, lower, of same area of CGRS 6 and associated pattern of linears in the region of the Rocky Mountains. Lineaments are more visible in mountainous regions at this resolution where interference is more pronounced. Rectangles indicate location of details, Figures 5.5 and 5.6. Arrows point to areas of visible gravity change. White circles in lower image represent Teewinot crater's inner and rim ring, with release valley in between, (1) Bighorn Basin. Black ring (2) Yellowstone Caldera, Wyoming, USA. (Accessed 3/12/2020.)

When Pacific 6 comes ashore onto the continent, it breaks up into a group of smaller wave expression which I will refer to as a "wave-train". While I am not ready to discuss the origin of the continents or "highlands' of the Earth, it is likely that they had to do with cratering also. As the energy from cratering is seen to interact like ripples from pebbles dropped into a pond, it is logical that more pebbles would produces greater confusion of ripple patterns as they constructively and destructively interact with additional ripples reflected off of the shore lines around the pond.

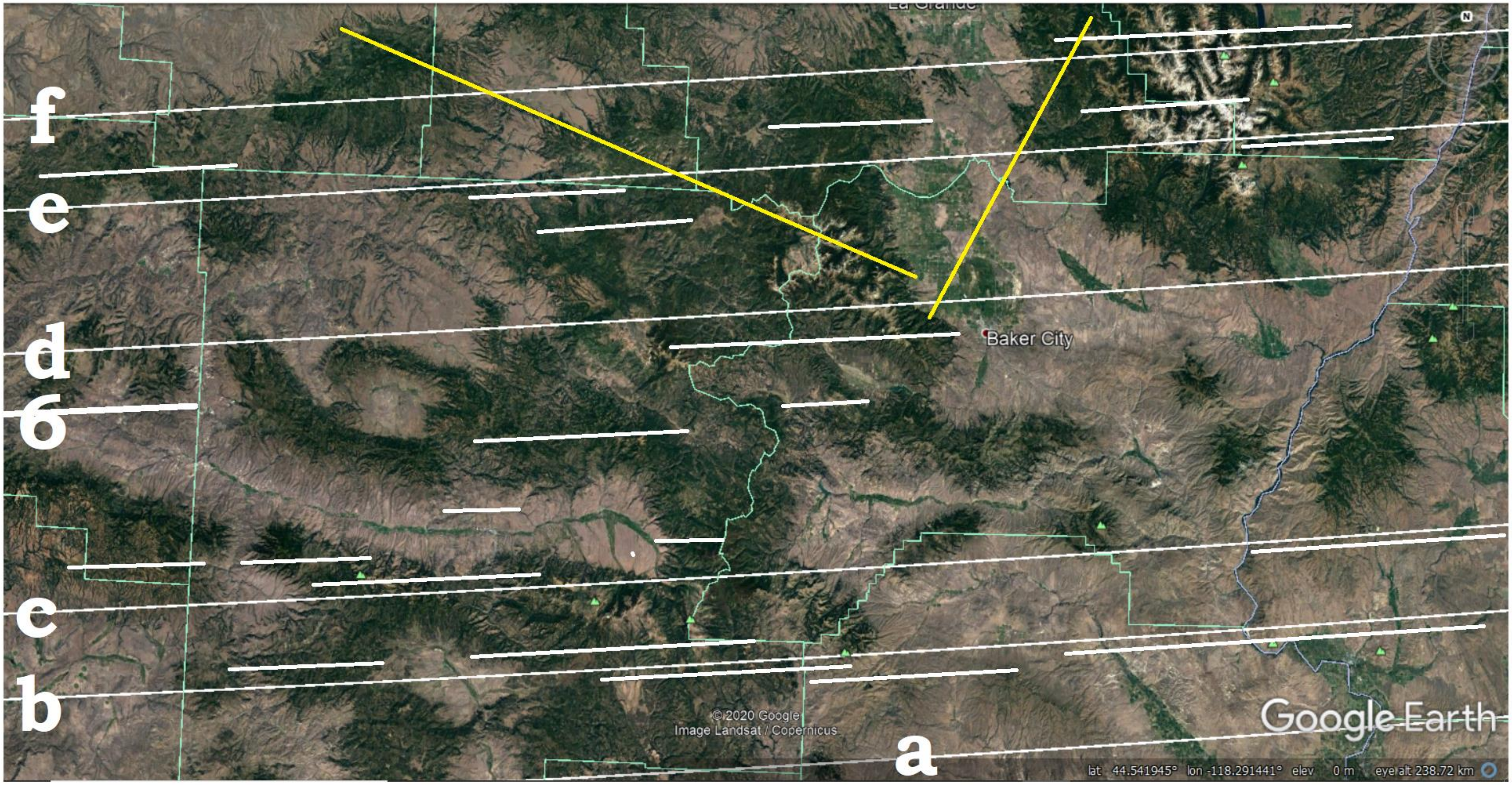


Figure 5.5: Google Earth detail of A, Figure 5.4, upper. Short white lines trace linears concentric to wave-train from Pacific 6. (Accessed 3/12/2020.)

Eastern Washington and a small part of Idaho, U.S.A. are shown in Figure 5.5. Only a few of the linears are indicated that are concentric to the Pacific 6 wave-train. At different viewing distances, totally different scales of linears become visible. The Pacific 6 is not the primary reginal fracture pattern visible in this image. The yellow lines show two more prominent reginal fracture patterns, and a careful observer can spot several others. Hoek and Martin (2014) recognized that linears required inducement, expressing shear, and chapters 3 and 4 recognized that the most probable source of that inducement was a shear center. As Pacific 6 CGRS represents one small circle expression from the Pacific shear center, it is reasonable to assume other regional fracture patterns represent CGRS from other shear centers. We can only expect to understand the geomorphology in a region after we have mapped the most prominent shear centers impinging on that area.

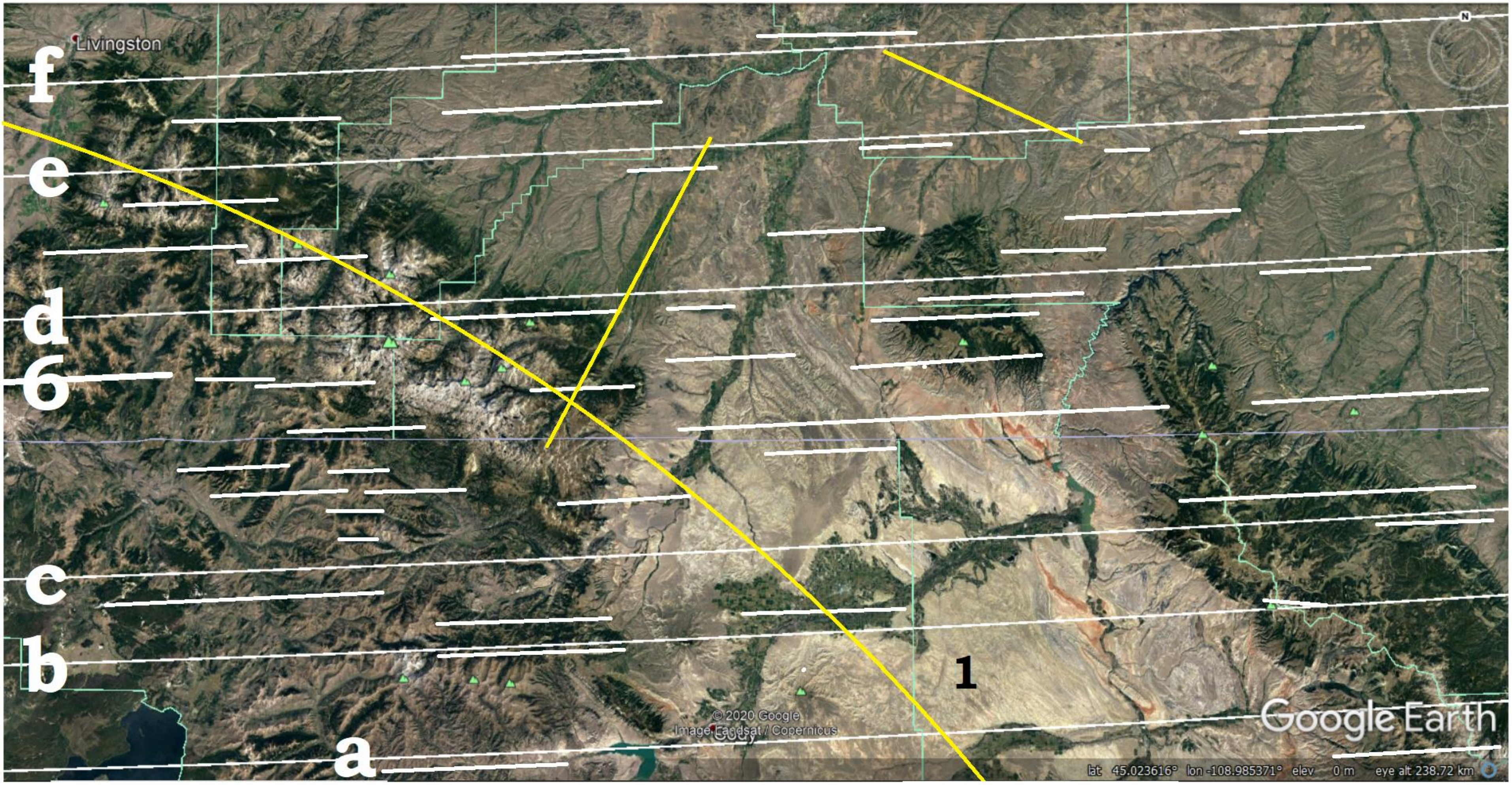


Figure 5.6: Google Earth detail of B, Figure 5.4, upper. Short white lines trace linears concentric to wave-train from Pacific 6.Yellow lines show prominent regional fracture patterns. (Accessed 3/12/2020.)

Wyoming and Montana, USA. comprise detail B, Figure 5.4. The primary structure (1) is the Bighorn basin. While the two straight yellow lines mark the same regional fracture pattern seen in detail A. The arced linear involving the Bighorn basin is a significant added feature. It centers on the Great Teton Mountains, and I have given the name Teewinot crater to it. (The local Shoshone people's name for the range meaning "many pinnacles.")

While the Pacific 6 is not the primary source of linears many additional concentric linears are found both inside the arced linear for the Teewinot and outside. Mountain uplift, with greater energy expression are primary locations of cumulative and subtractive energy expression. Many more could be marked. How many additional sets can the reader locate?

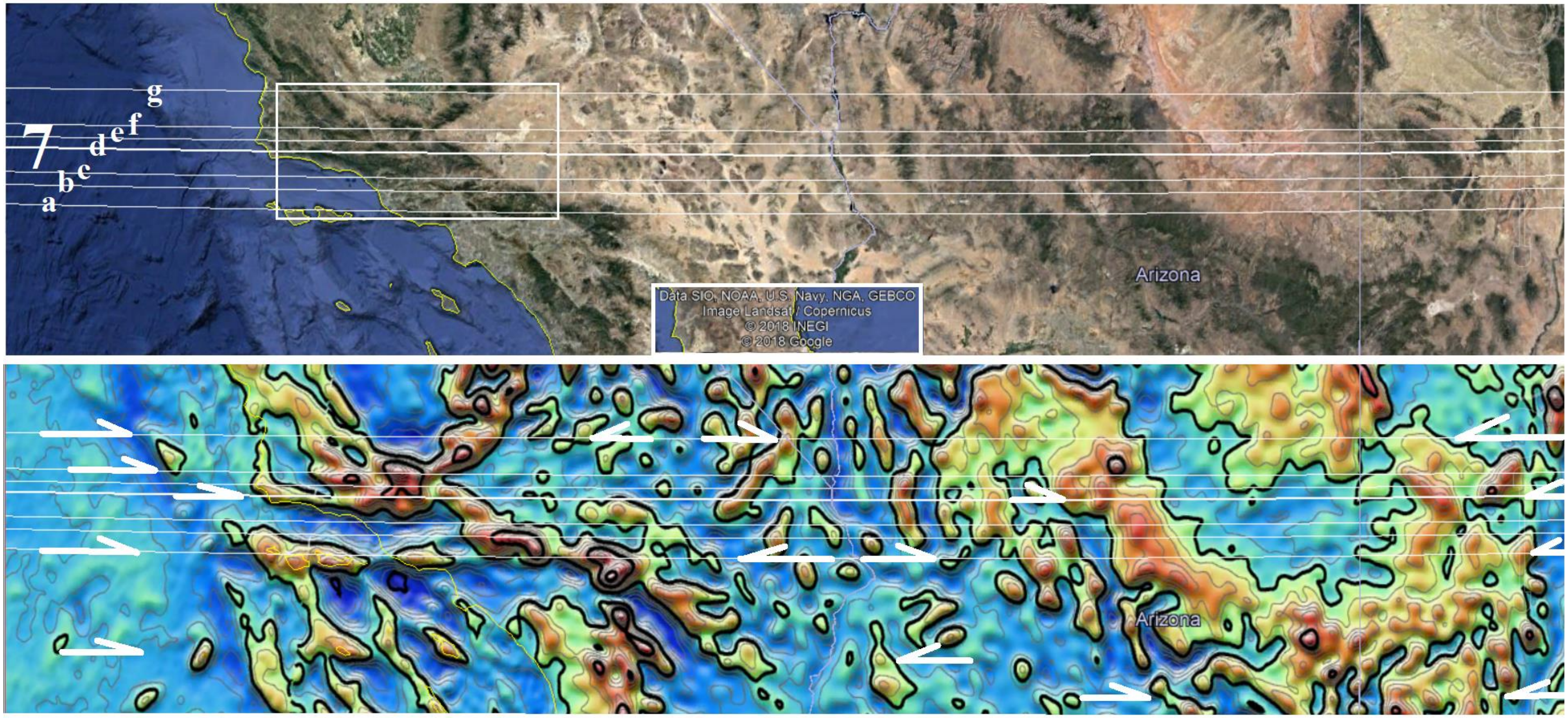


Figure 5.7: Google Earth and GGA images of same area of CGRS 7 and associated linears in crossing California. Rectangle indicates location of Santa Barbara detail used in Chapter 7. (Accessed 4/21/2018.)

Linears are located relatively close together, often limited only by the level of detail available in the image. I find it best to locate them at high detail, close in, and then zoom out to gain this larger view. Spacing of linears in the wave-train are not the same associated with Pacific 6 as with Pacific 7, but the same relative associations extend across California and Arizona in this larger view. In GGA Map, observe variations in gravity readings at linears extend not only through regions of high gravity anomaly, but there are correspondent variations in regions of low gravity anomaly. This shows linears are produced by an energy difference that extend through other energy patterns. A gravity view is a cumulative view of additive and subtractive energy summation for each specific spot, like the ripple pattern in a pond.

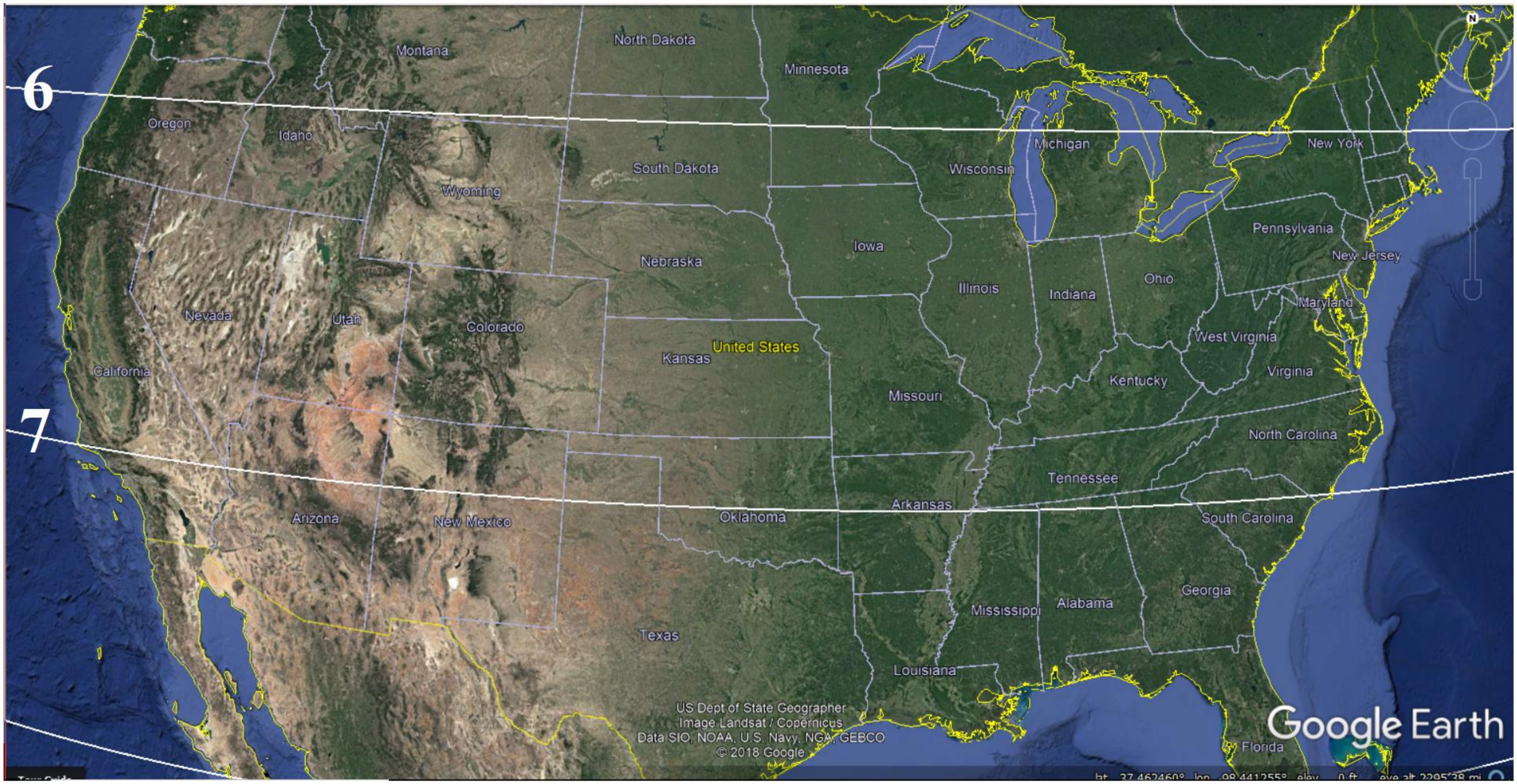
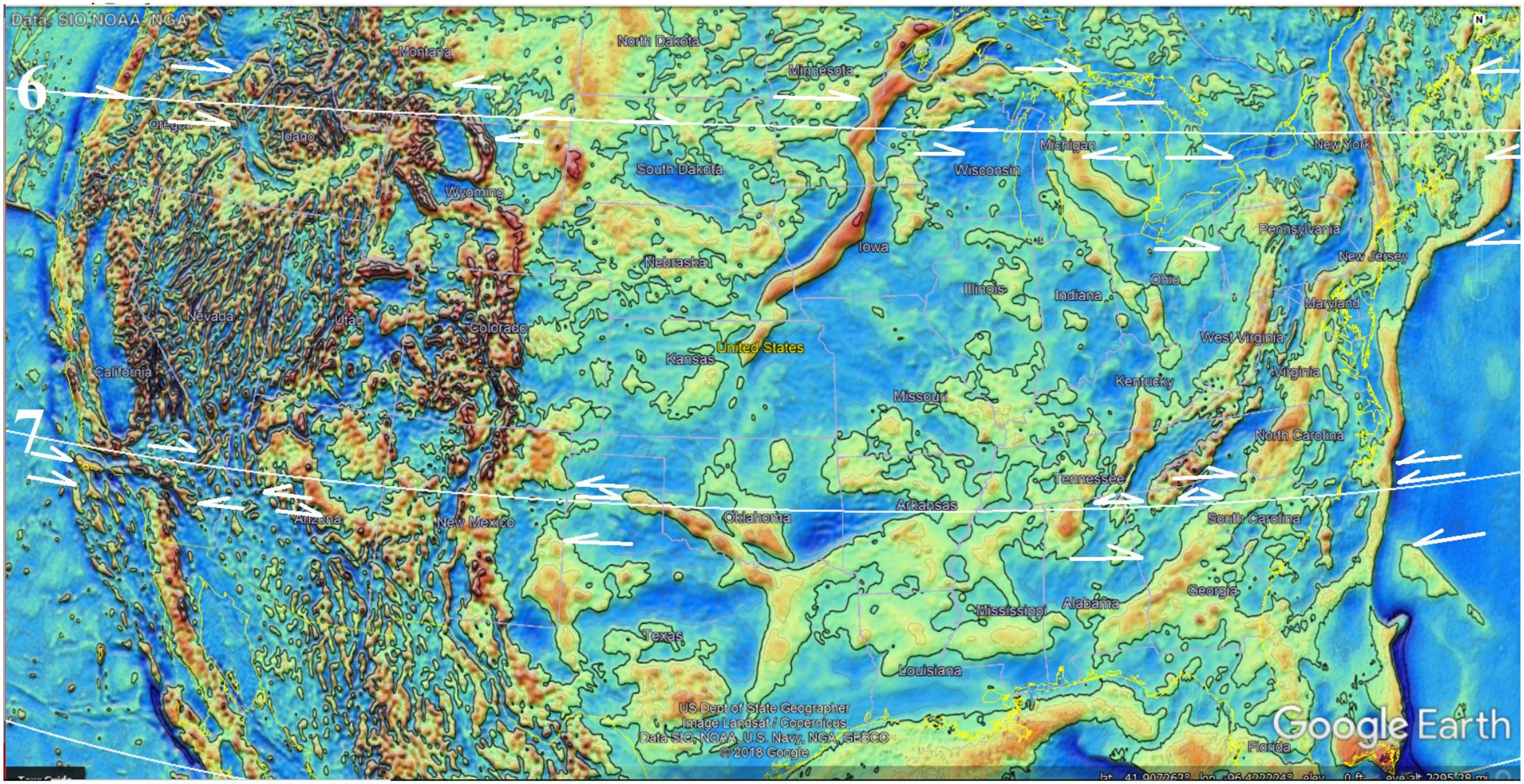


Figure 5.8: Google Earth Landsat image of route of Pacific 6 and 7 and North America Continent. (2015. 33.137283˚N, -112.380054˚E, accessed 4/21/2018.)

As the view progresses outwards from Figures 5.4-5.6 and 5.8, linears appear less and less in the topography view but more and more in gravity. This is a function of the resolution, and is a confirmation that we are dealing with something real, not a preconceived notion in our head. When viewing Google Earth with KML files overlay of the Pacific CGRS system, linears can be traced continuously as the view is panned up and down, not only across the continent but globally.

While Google Earth has become a common tool for many everyday applications, it is not a simple tool. The images are the best the US Department of State Geographer can obtain. The Landsat and Copernicus satellite missions cost millions of taxpayer's dollars, and the gravity map is the best there is for the resolution. Many geologist may not know how to read it, because they use the wrong model for trying to interpret the structure. But, ignorance of the evidence does not negate it.



Sandwell et al (2014) finds gravity patterns confusing because they do not conform to projected plate tectonics models. This exemplifies the problem of interpreting Global Gravity Maps without understanding the cratering process and energy signature left after the event. Various authors try to find patterns in gravity that recognize plate movement or mantle movement to cause continental drift. A summary of the literature would add little, but a cratering model fits all available data in gravity. Again, GGA maps are criticized as being too simple. This map is not simple, but finding the pattern within it begins with recognizing the linears of an impact. Without the basic recognition of impact, gravity maps will remain outside the understanding of geologist at this scale.

Figure 5.9: Google Earth and GGA map of United States, showing paths of CGRS 6 and 7 and some highly visible concentric linears. While most are in the mountainous regions of both coast, note the mark as CGRS 6 crosses the Mid Continental Rift in Iowa and Wisconsin and the large blue area of CGRS 7 in Oklahoma and Arkansas. Note the difference in visibility between Figure 5.7 and 5.8-5.9, caused by difference in viewing elevation. This emphasizes the value in reconstructing the KML files, Chapter 4, for the Pacific CGRS so the reader can pan up and down through the various resolution in Google Earth. Resolution on GGA definitely favors the zoomed out view. (2015. 37.462460˚N, -98.441255˚E, accessed 4/21/2018.)

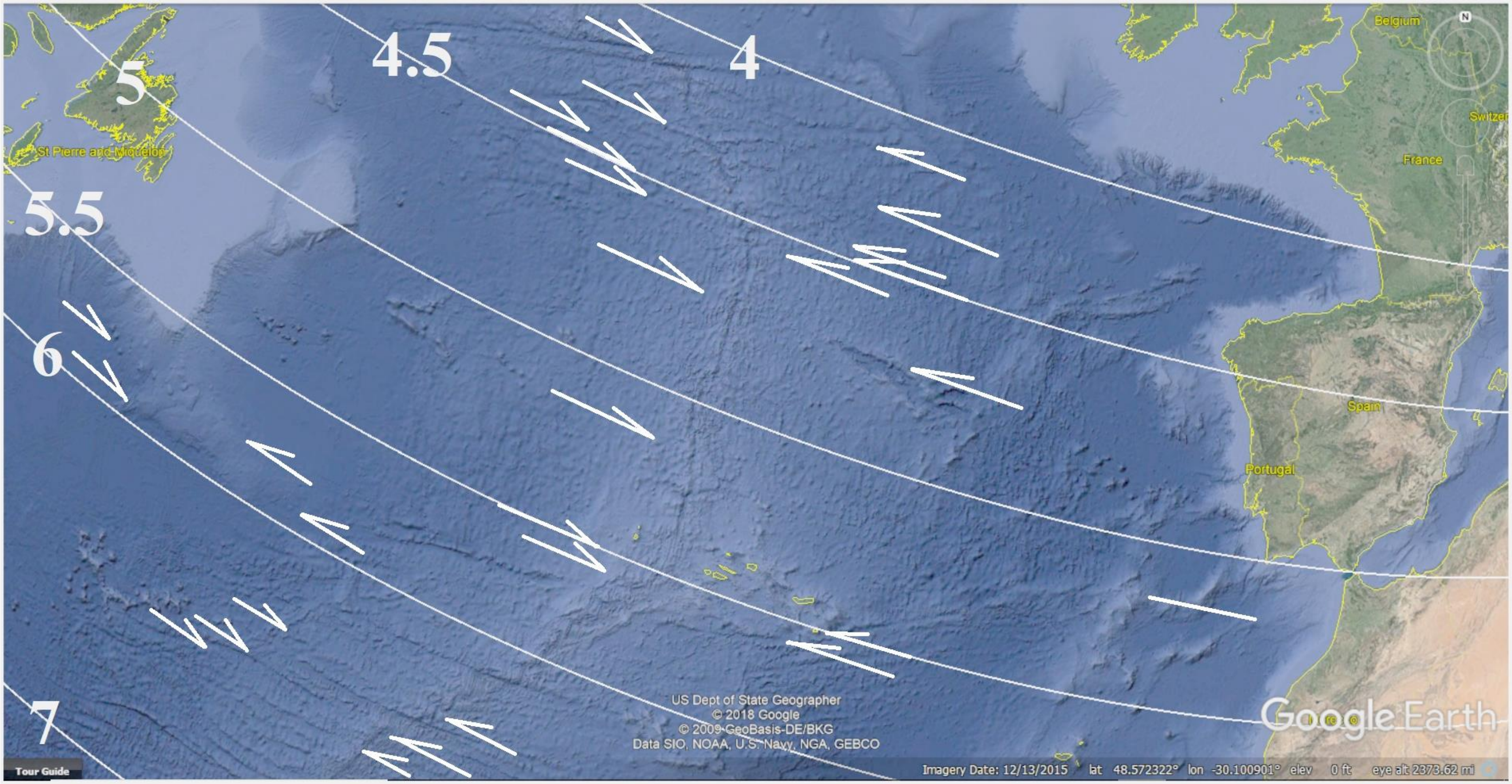


Figure 5.10: Google Earth and GGA images North Atlantic, showing paths of some Pacific CGRS and associated concentric linears. (Accessed 4/21/2018.)

Mid-Atlantic Ridge

The Mid Atlantic Ridge is a good location to view linears as is any mountainous region. When the area gets the final thrust to push the mountain ridge up, the substrate is hot and plastic if not molten. This hot substrate adds to the underlying energy waves, so it raises everything according to the summing of the individual energy signatures.

The Atlantic Ocean certainly has many more visible linears than the Pacific Ocean. If the Pacific Fracture Zones had occurred amidst the many lines of the North Atlantic, it is doubtful that they would have been noticed. Very obviously, God was doing something in the Pacific Ocean to deflect many of the impactors there. Possibly, this was related to the position of the Ark in the time frame these events were happening.

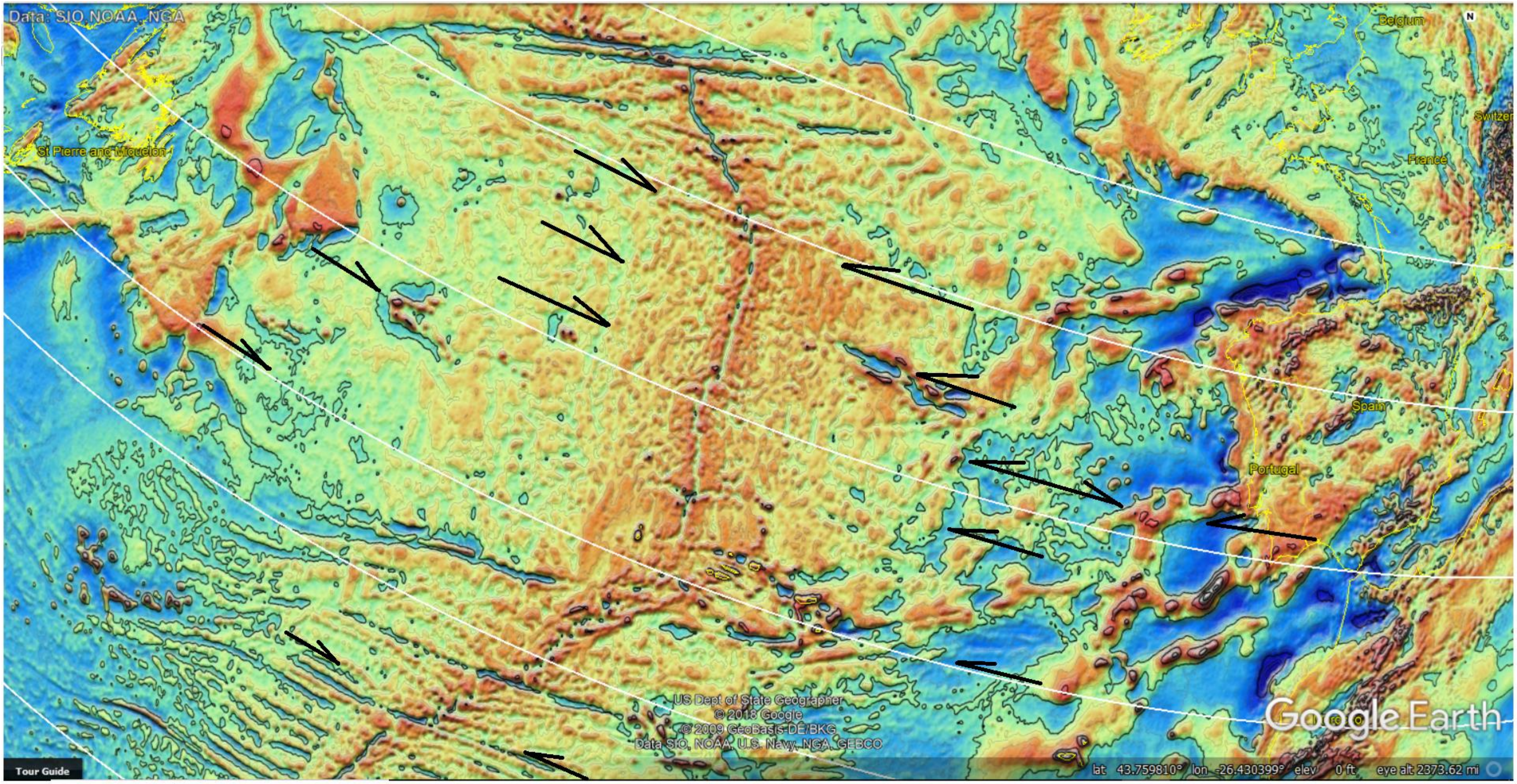


Figure 5.11: GGA map of the North Atlantic, exact same area as Figure 11. Mid Atlantic Ridge is visible as the orange double strip down center. Several concentric CGRS are indicated by black arrows. (2015. Accessed 4/21/2018.)

An impact model does not deny the existence of the Mid Atlantic Ridge or any of the other ocean ridges that are found on earth. The GGA map reinforces their existence, but we need to carefully reexamine their genesis. The ridge follows several large arcs, but has several medium size circular lineaments atop it. Its origin is within the time that impactors were striking the Earth. Small rings can be seen in Topography map and medium size rings can be seen in gravity maps showing very little or no movement has taken place at this site since the craters began to form.

For some reason the myriad of CGRS left many more lineaments much more prominently here than on the continents. This allows us to recognize how much of the continents must be affected by CGRS linears, whether we see them or not.

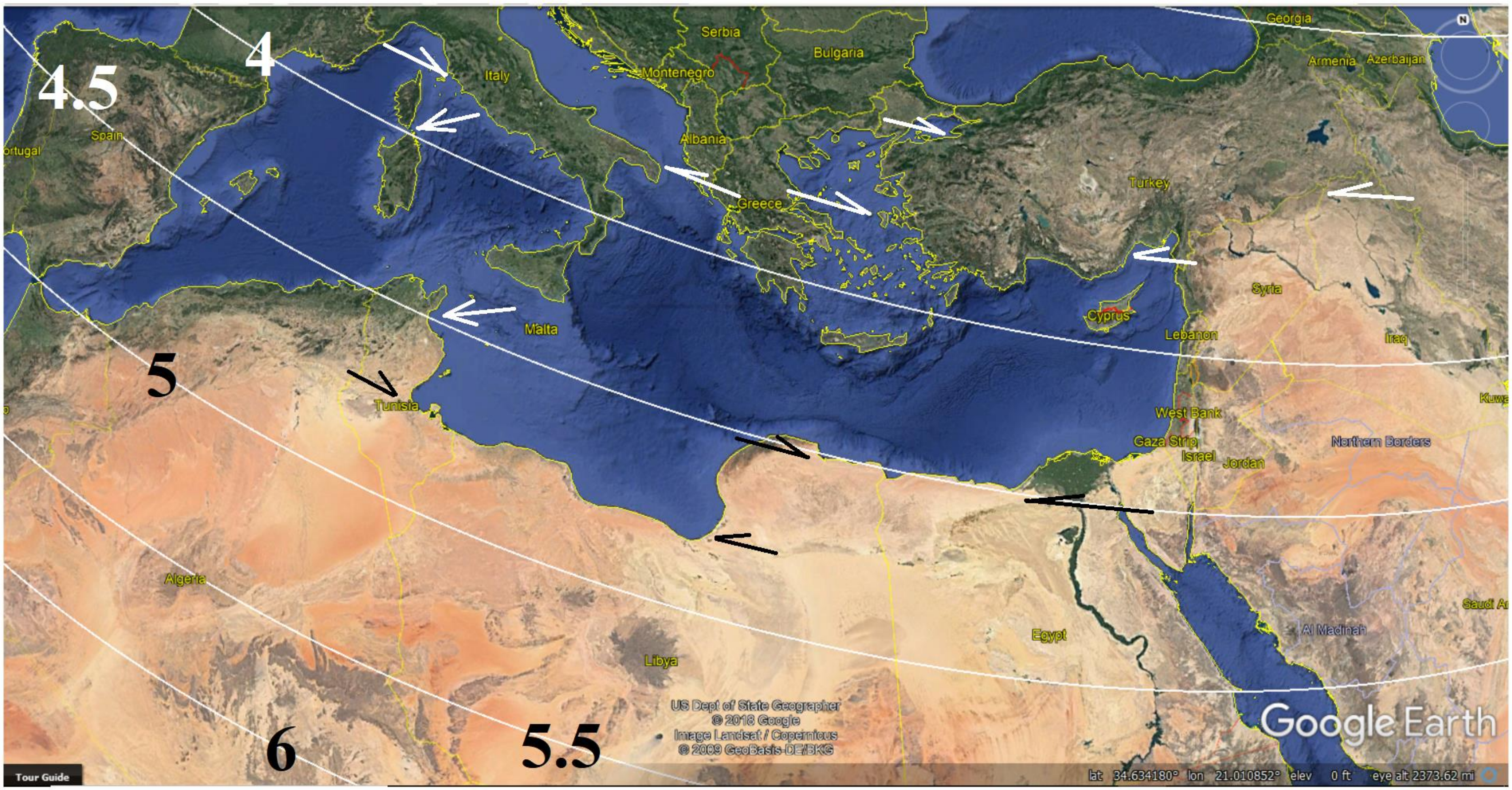


Figure 5.12: Google Earth as it crosses Europe and North Africa. (2015. 33.137283˚N, -112.380054˚E, accessed 21 April 2018.)

Mediterranean and North Africa

Some areas have far more visible linears, probably because they received fewer interfering waves in the same time frame. The linear just north of GCRS 4 makes a straight ridge across the arced Taurus Mountains of Turkey, produces an east-west linear across Greece, comes into Italy through the "boot heel" and extends past Florence. CGRS 4.5 extends from the Nile Delta, where it determines the southern extreme, through to Tunisia, providing the up-thrust which provided much of the coastline. The northern coast of Libya has a concentric linear at Tripoli and another at Abu Kammash.

At this elevation CGRS 5 does not have a significant topographic signature on the Sahara, but GGA, Figure 5.13, shows several linears across the area.

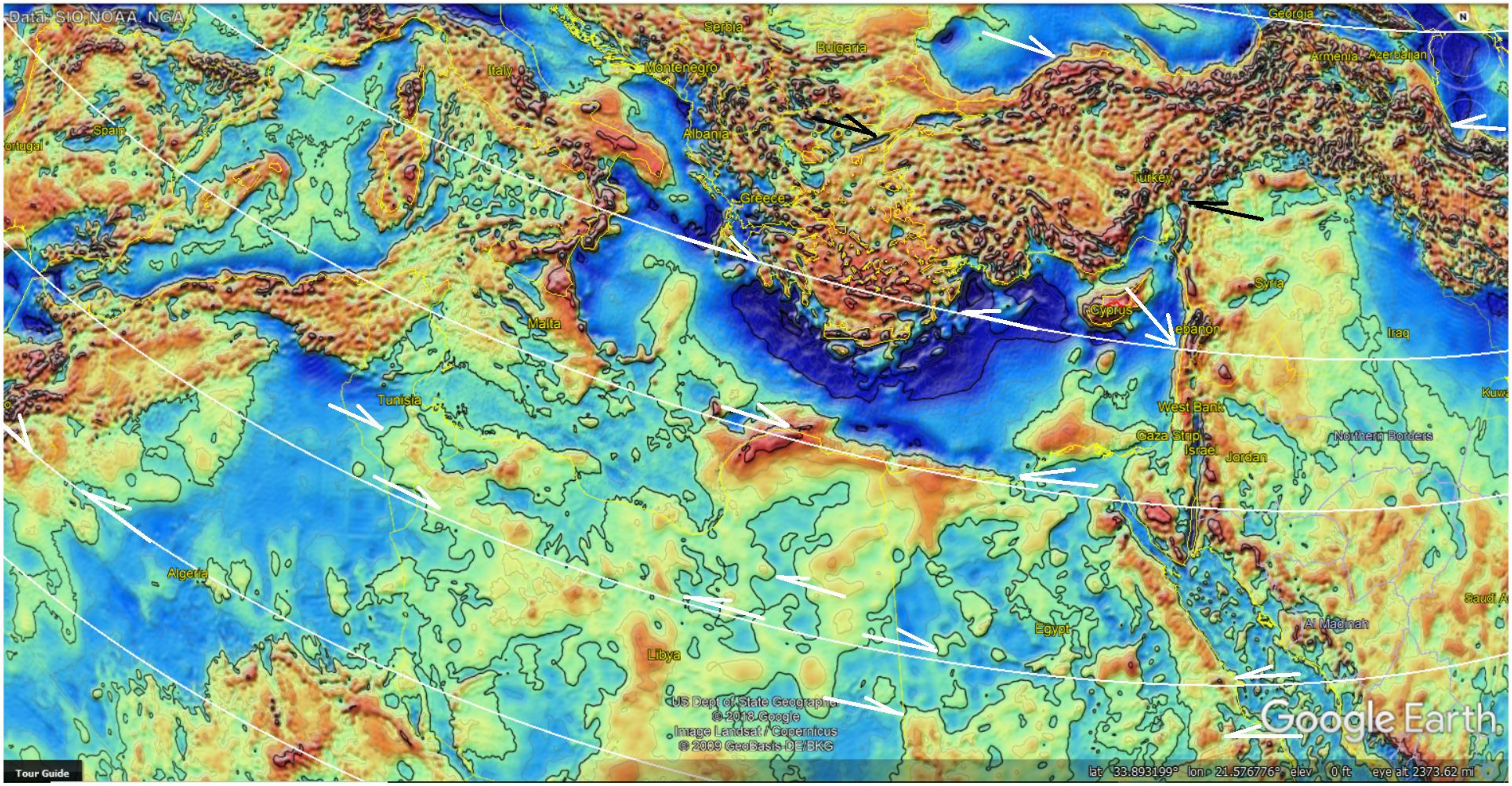


Figure 5.13: Google Earth and GGA showing northern Africa and Mediterranean with shorelines and other prominent concentric elements. (2015, accessed 21 April 2018.)

Many lineaments extend concentric to the Pacific CGRS across the Sahara Desert. A number of the linears have been marked for the reader, but more can be seen. You are encouraged to locate as many as you can for yourself. Seeing straight and circular lineaments is helped by practice.

Why Europe has so much more interference in the patterns and why North Africa has so much less is a very good question for a research project. Figures 5.22 and 5.23 are south of this area and many more circular lineaments can be seen in that area.

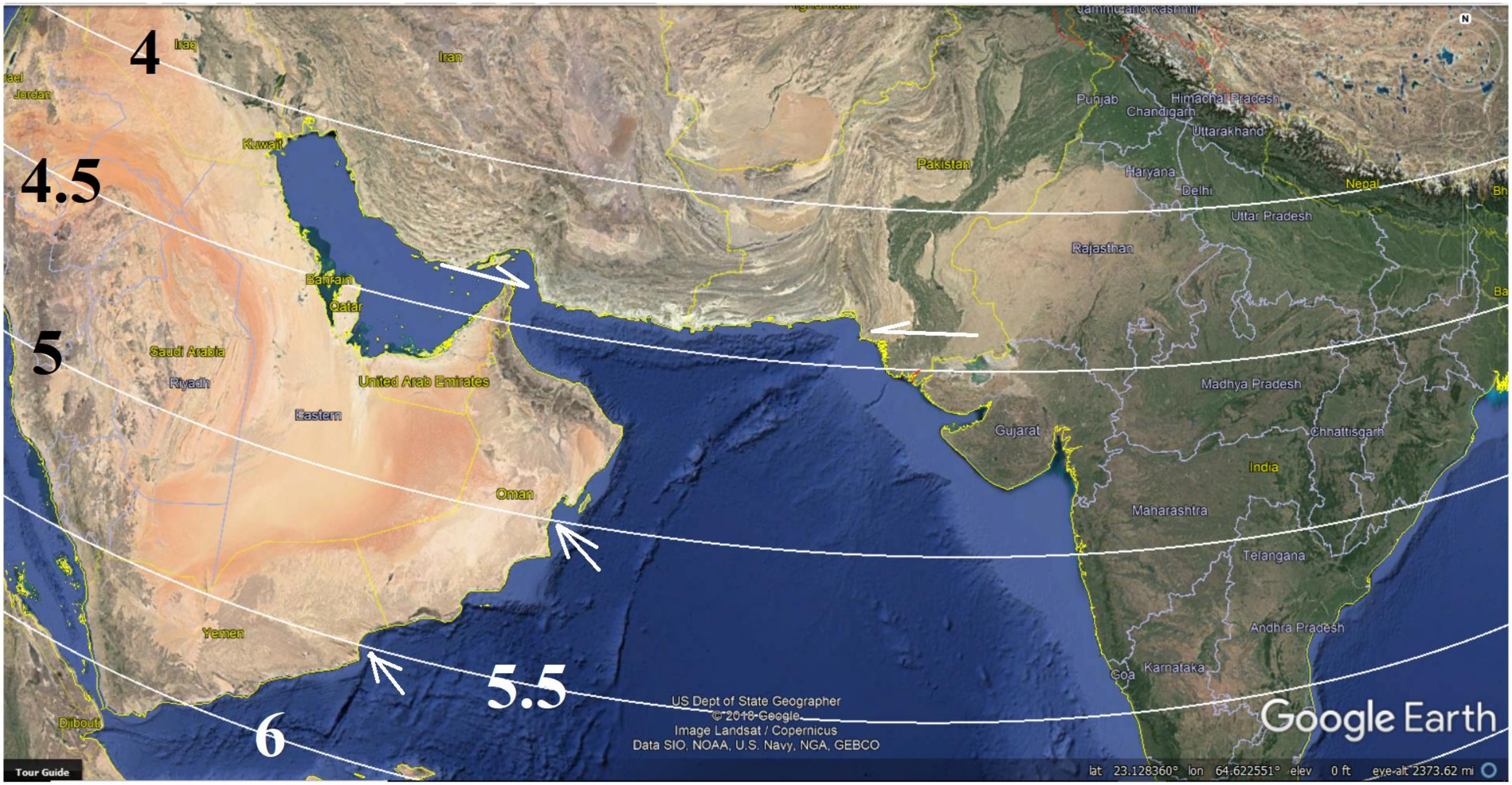


Figure 5.14: Google Earth image of Arabian Peninsula, Arabian Sea and India (2015, accessed 4/21/2018.)

Arabian Sea

While several areas of the Mediterranean coast are defined by the Pacific CGRS (Figure 5.13), only the coast line of Iran and Pakistan in the Arabian Sea are defined by them. Looking at Saudi Arabia's southeast coast, in GGA it shows a more straight linear, but in Landsat shows distinct bays in the coast line. This suggest CGRS 5 and 5.5 are following release-wave lineaments, and the bays are part of the release wave valley's expression while the most pronounced shock-wave is concentrically north and south of them. This pattern can also be traced east, across India especially between CGRS 4.5 and 5, where state lines follow a linear path of ridges. This linear is highly visible in the GGA map.

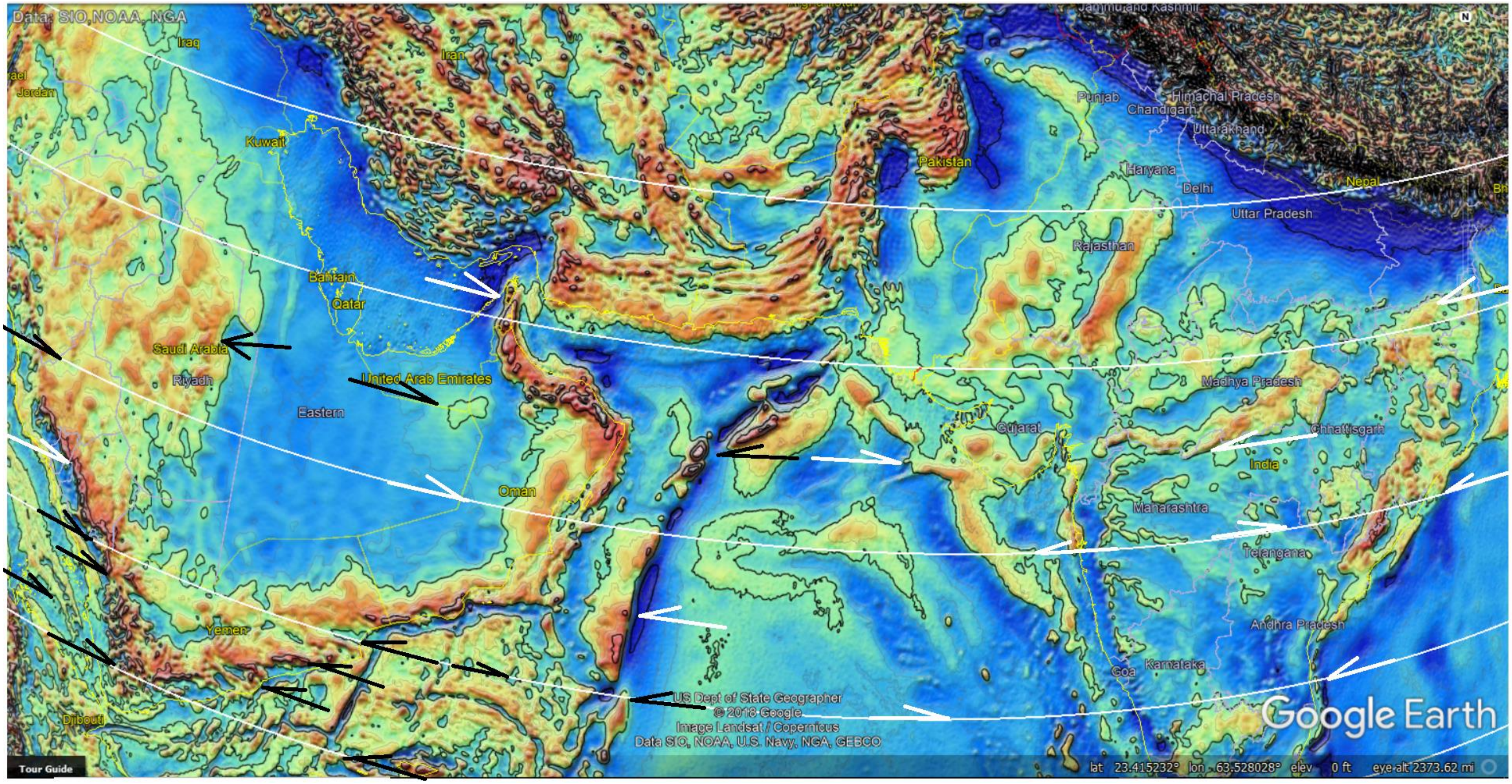


Figure 5.15: Google Earth and GGA image of Arabian Peninsula, Arabian Sea and India (2015, accessed 4/21/2018.)

For many, the main problem with understanding gravity maps of Earth is that their minds are already made-up to what the evidence should show. Very few linears are concentric to shore lines, reflective of plate collisions, which are the primary source of shear in the Plate Tectonics model. Paths of hotspot migration are missing. Paths of continental drift are absent. India is supposed to have moved northward to converge, pushing up the Himalayas. Yes, some linears appear across the landmass that direction, but why are there just a few? Why not a continuous train of linears tracing the closing like the opposing ridges on each side of the mid Atlantic Ridge? Or if the ridges were pushing India northward, why is there not continuous banks of ridges off the shore of India pushing it north? If the evidence does not fit their model, maybe their model is wrong?

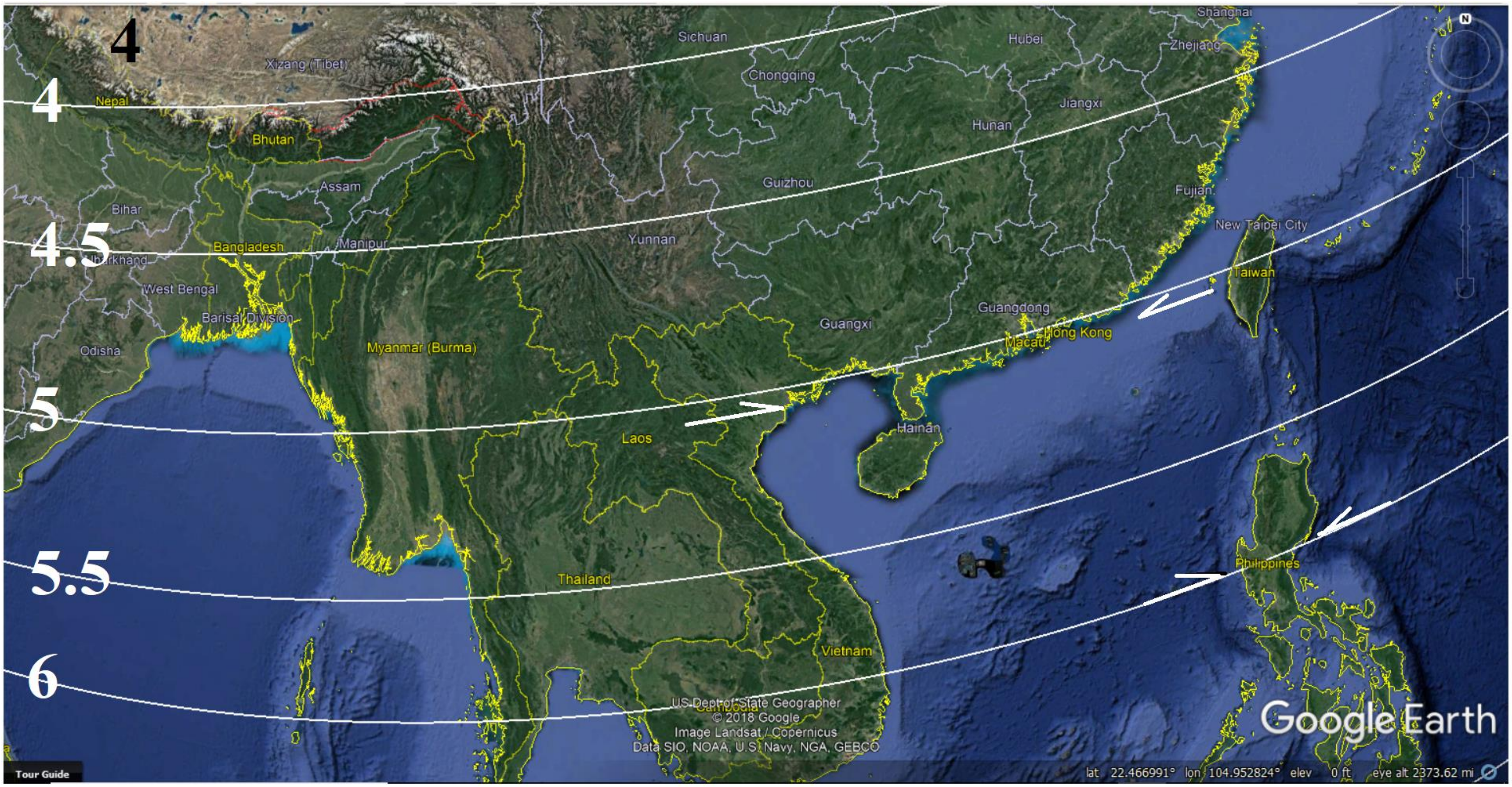


Figure 5.16: Google Earth images of Southeast Asia. (2015, accessed 4/21/2018.)

Southern China and Southeast Asia

GGA shows this region to be a maze of high and low area of gravity anomaly, while the Arabian and Indian Seas are areas of relative level low gravity. Many linears going a myriad of directions can be traced. Pacific 4.5 is traced all across China. The other Pacific CGRS south of it produce distinct linears across Taiwan and the Philippines.

The distinct lines of mountains, from ridges that reach south from China, and mostly end in the sea to either side of Southeast Asia. What was the shear to pushup those mountains? It was not from the direction of the sea which might have pushed the land into place in a plate tectonics model.

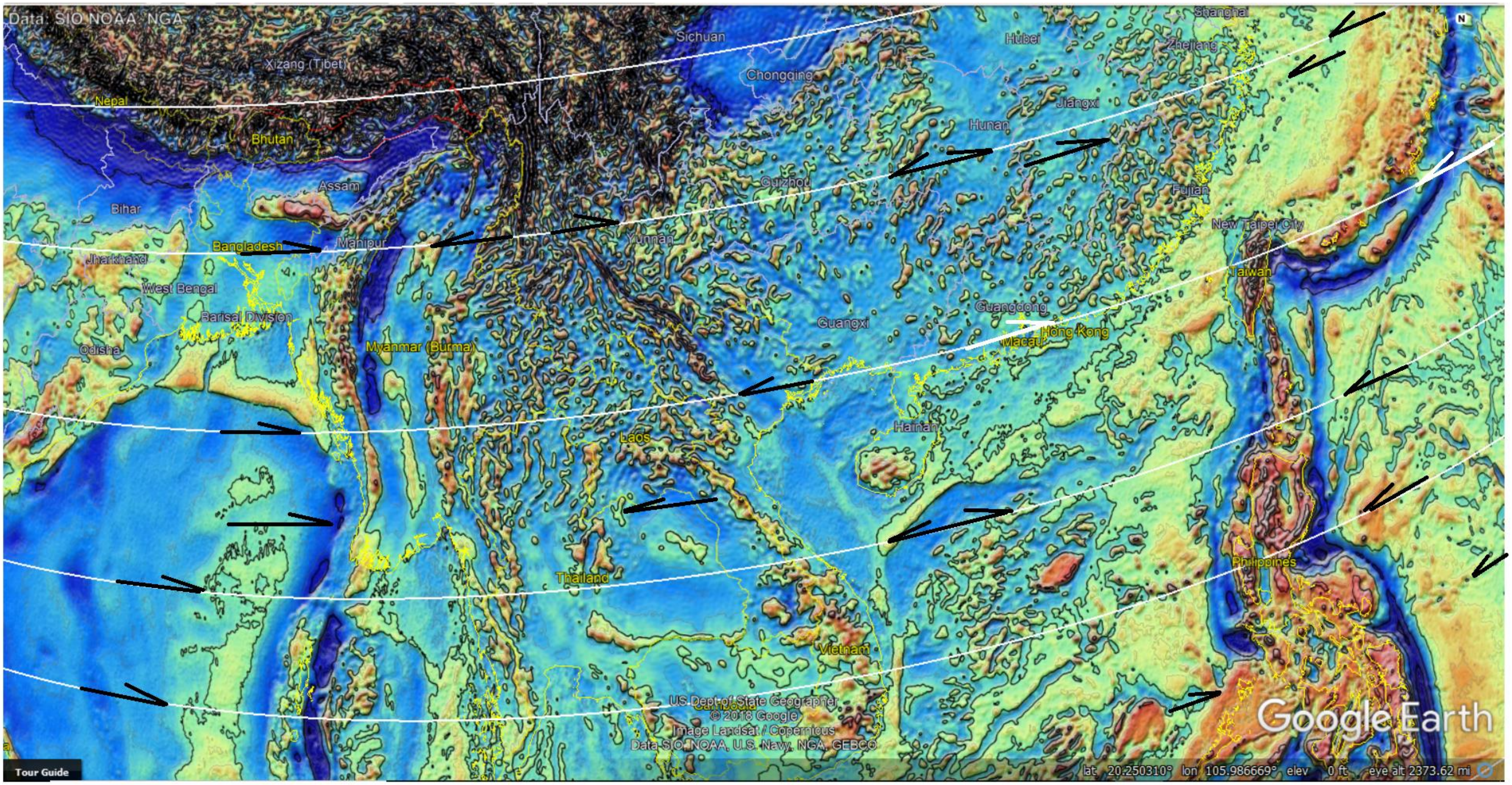


Figure 5.17: GGA images of Southeast Asia. (2015, accessed 4/21/2018.)

In Yunnan and Myanmar (Burma), the mountain ridges are obvious, not because of topography in a gravity map, but because of the mountains' lithology. Then, suddenly, Thailand's great valley has a low gravity reading very similar to Bighorn Basin in Figures 5.4 and 5.6. Is this also because it is a release wave valley? There are many more visible linears in this area, so it is not as easy to locate a circular lineament that it is a part of this valley.

Yet through all of the myriad of linears, the Pacific CGRS leave their own linears, some marked by arrows.

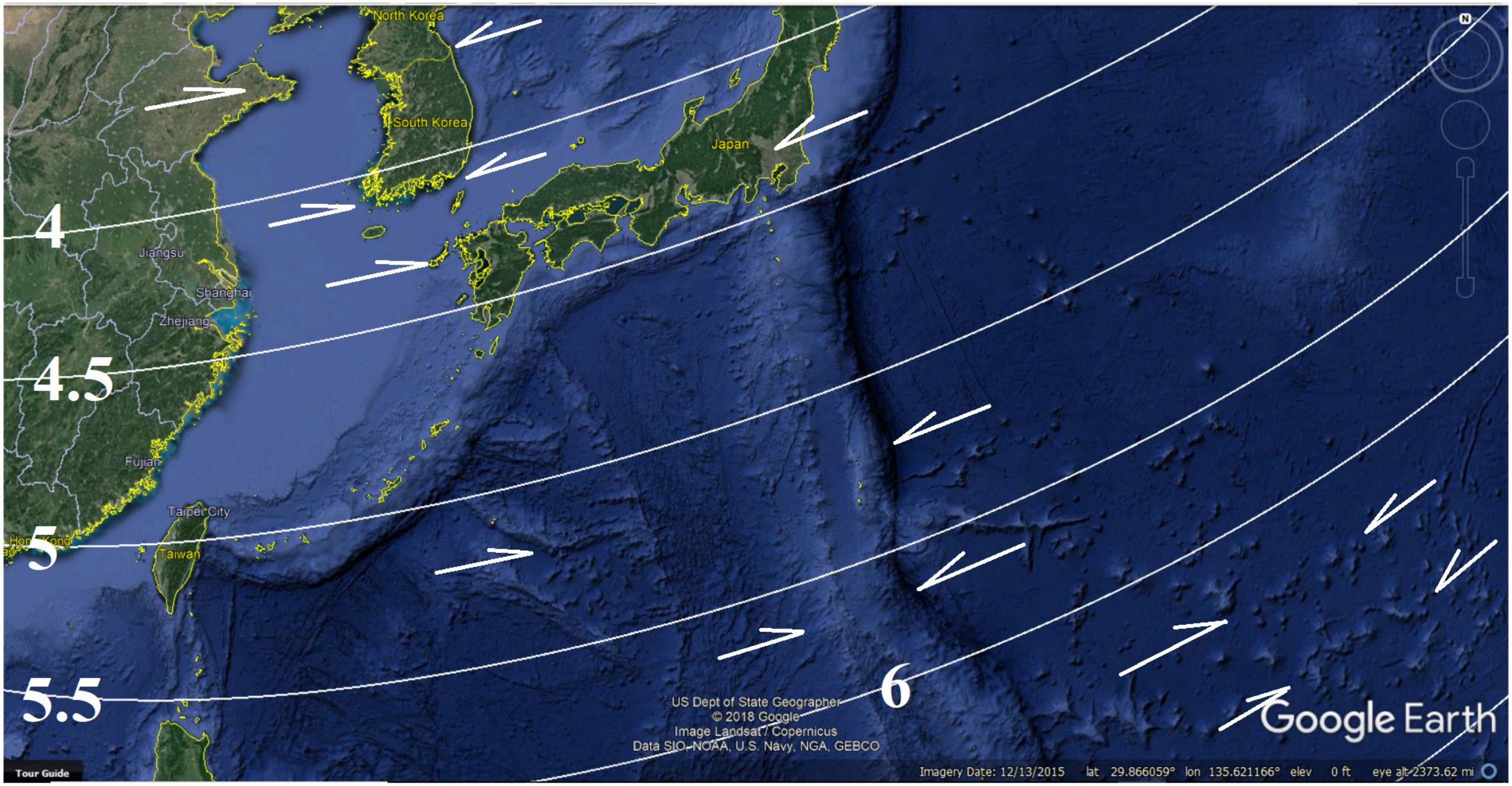


Figure 5.18: Image of Philippine Sea and Western Pacific Ocean in Landsat and NOAA (National Oceanic and Atmospheric Administration) data. (Accessed 4/21/2018.)

Philippine Sea and Western Pacific

As in other areas of the globe, when CGRS go through mountainous regions, even when they are on the sea floor, linears are much more visible. This emphasis that mountains represent a great expenditure of energy, and where energy has been expended the contrast between linears of high energy/gravity and low energy/gravity are emphasized.

While this area of the globe was not primarily shaped by the Pacific CGRS, they leave their mark in the mountains that divide Korea into North and South, form the volcanic backbone of Japan, and ordering the small island peaks into rows all across the region. The linears from the Pacific CGRS are more visible in gravity than they are in Landsat.

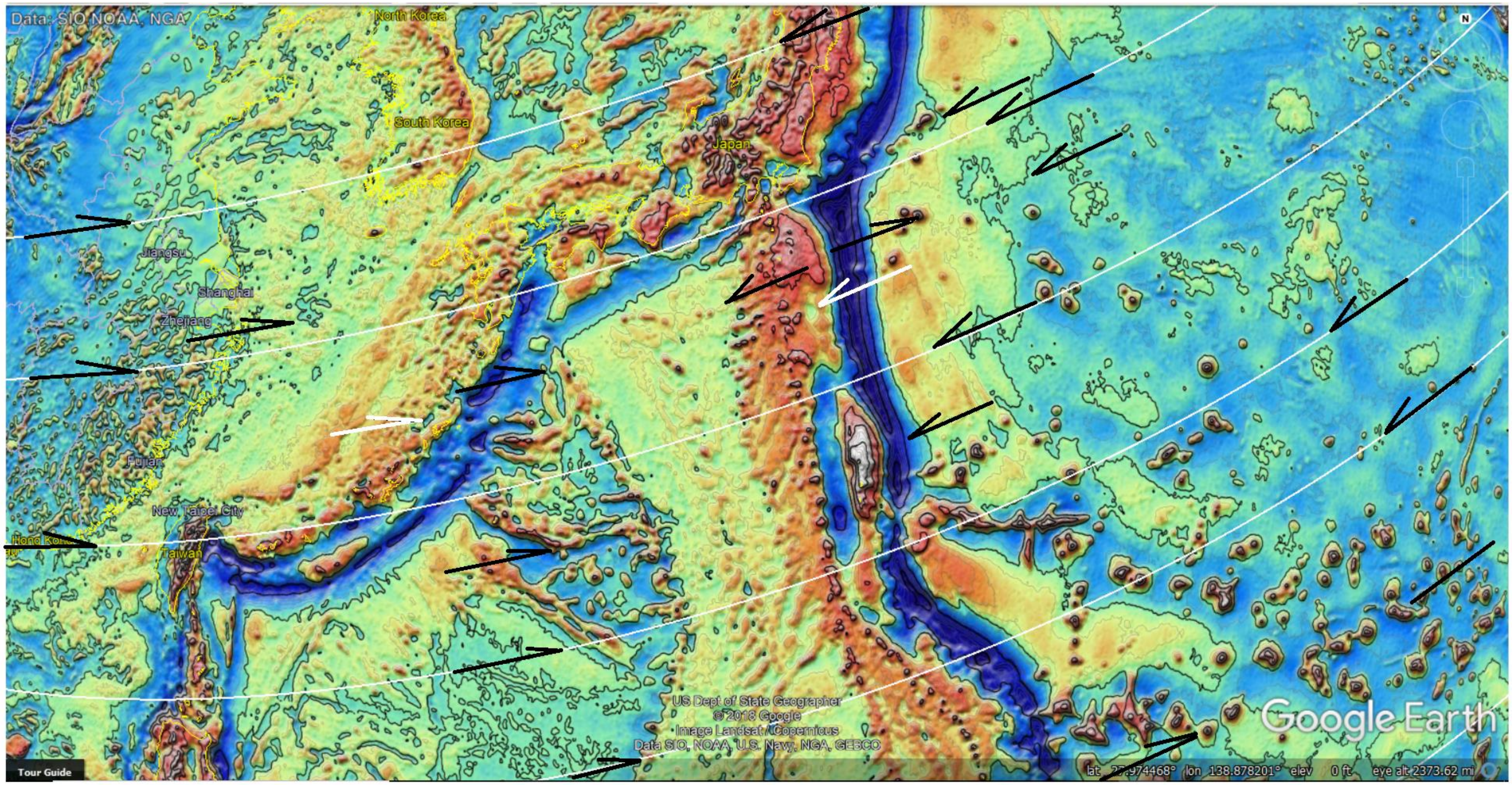


Figure 5.19: Google Earth and GGA images of Japan and the Philippine Sea. (2015. 29.866059˚N, 135.621166˚E, accessed 21 April 2018.)

Trying to understand the research on gravity readings, Mahan et al (2012) thought xenoliths might be responsible for seismic structures. Colli et al (2016) concludes while considering isostatic support for topography that dynamic topography exist without a corresponding gravity signal (Maybe isostasy needs to be reconsidered.). Steinberger (2016) offers four reasons for topographic variations: "(1) variations in crustal thickness and density structures, (2) oceanic lithosphere age differences, (3) subcrustal density variations in the continental lithosphere and (4) convective flow in the mantle beneath the lithosphere." Hoggard et al (2017) thought topography is determined by crustal thickness and density variation. Ebbing et al (2018) cite that topography and plate tectonics do not account for gravity anomalies, and they try to tweak the gravity readings, suggesting global curvature has a significant bearing on the patterns seen. This is convoluted reasoning.

I have determined topography is NOT related to gravity. They occur in the same place because they have the same cause, differently expressed. Topography and gravity readings, both, reflect the energy envelope of impact craters on earth just as they do on the moon.

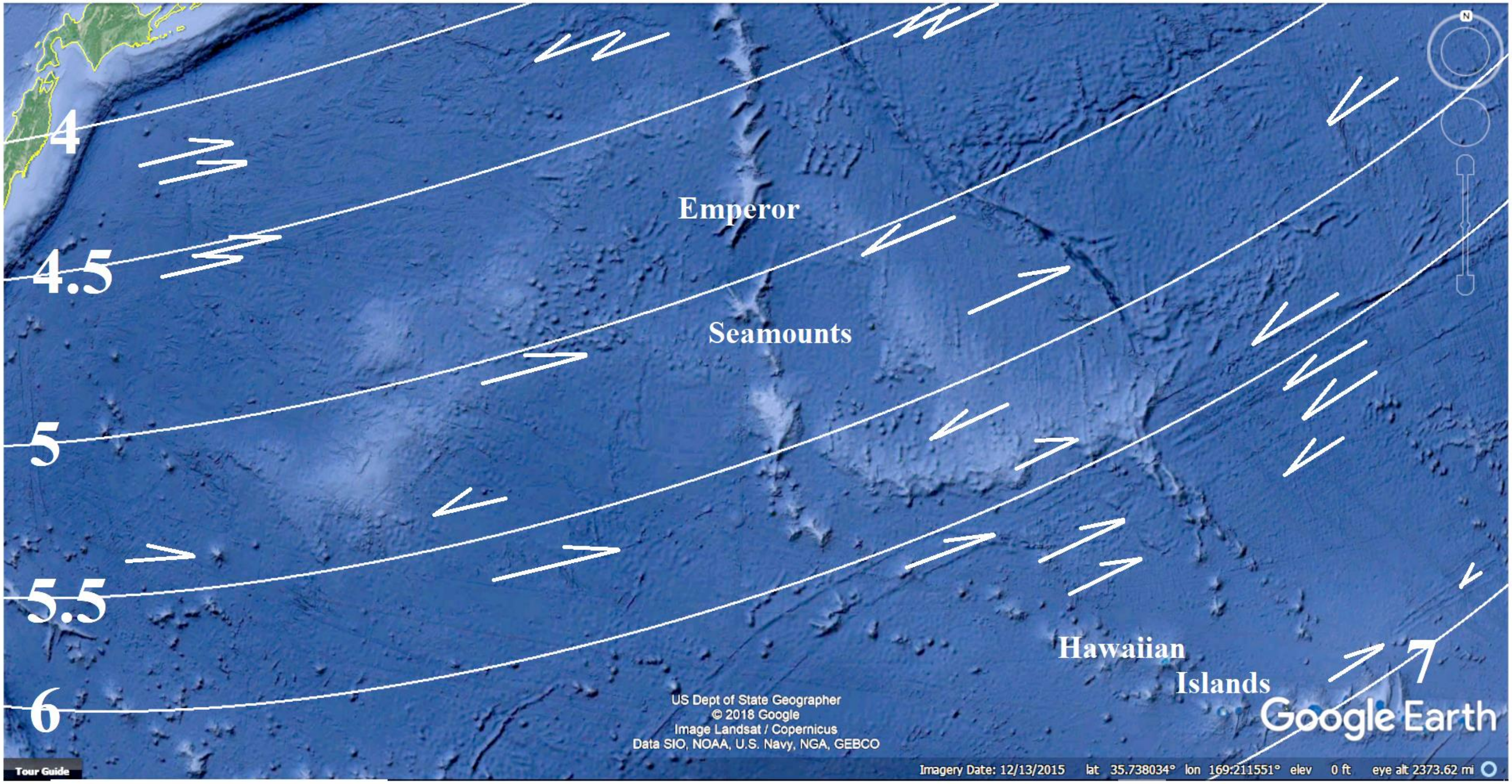


Figure 5.20: Google Earth images of the northwestern Pacific Ocean. Big Island, Hawaii is in the southeast corner of image, Accessed 4/21/2018.)

North Pacific Ocean,

Emperor Seamounts and Hawaiian Island Chains

Figures 5.20 and 5.21 are the northwest quadrant of Figure 5.1. These CGRS have been mapped completely around the globe. Comparing Figure 5.20 to 5.1 shows how much of the sea floor topography is masked by the dark blue fill used. Many linears do appear on the ocean floor. The Pacific Fracture Zones are part of a linear system that is global in its extent.

Hartmann and Kuiper (1962) when speaking of the moon recognized no folded structures existed there, so that all lunar mountains can be traced back to cratering event. If this pattern of Pacific CGRS completely around the globe is traced in concentric relationships to a shear center, then all linears on Earth may be CGRS lineaments and traceable to some shear center.

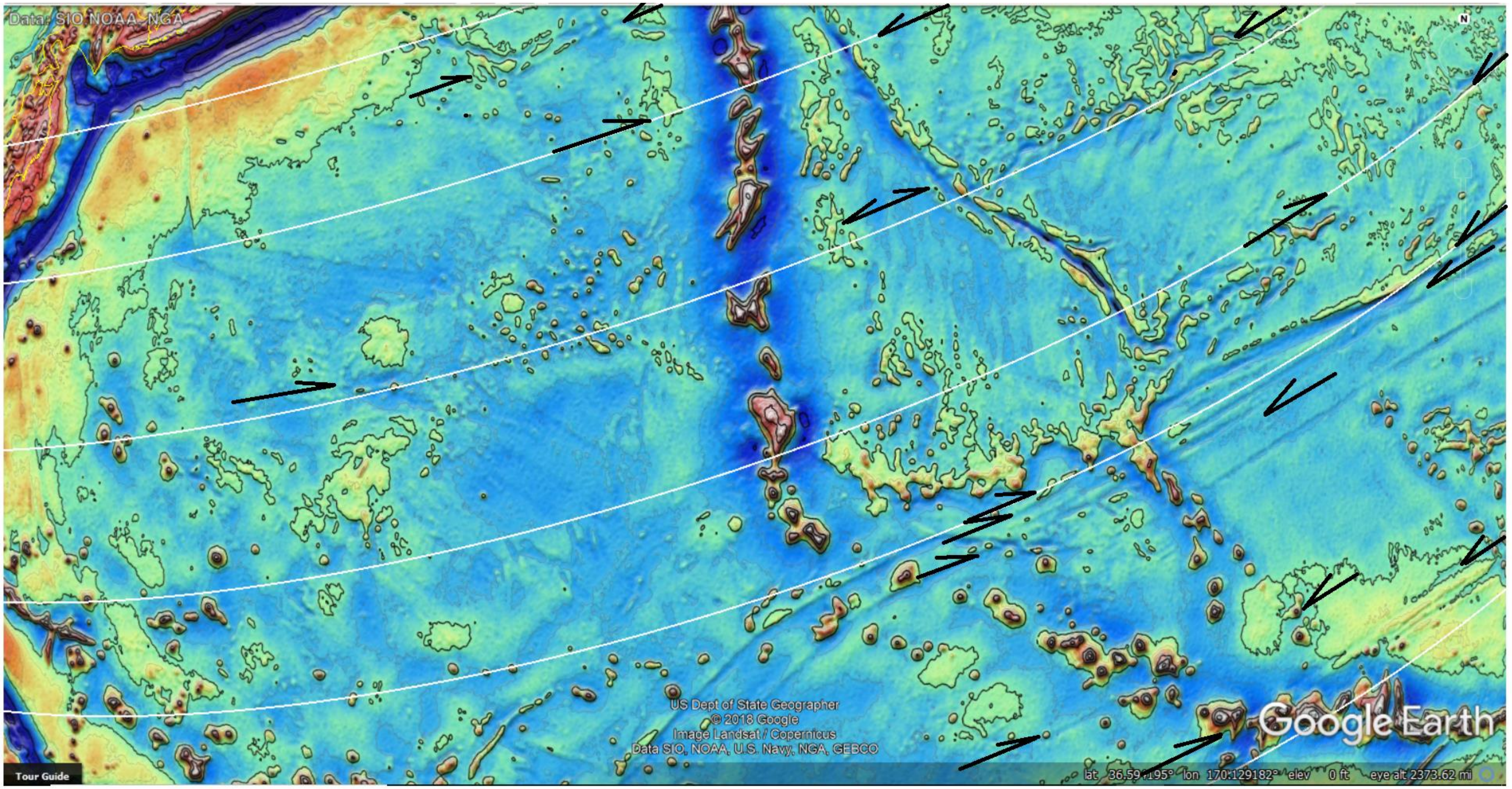


Figure 5.21: Google Earth (color modified) and GGA image of western Pacific Ocean. (2015. 35.738034˚N, 169.211551˚E, accessed 21 April 2018.)

While CGRS 5 and 6 do not have many indicators of the trend, they have been broken up into a wave train that does leave a clear record south of CGRS 6. The GGA map shows even more concentric to the Pacific CGRS. But many more linears are laying in other trends. One of those other trends contain the Emperor Seamounts, another includes the Hawaiian Islands. Many more sets of CGRS must exist to account for all of these additional trends.

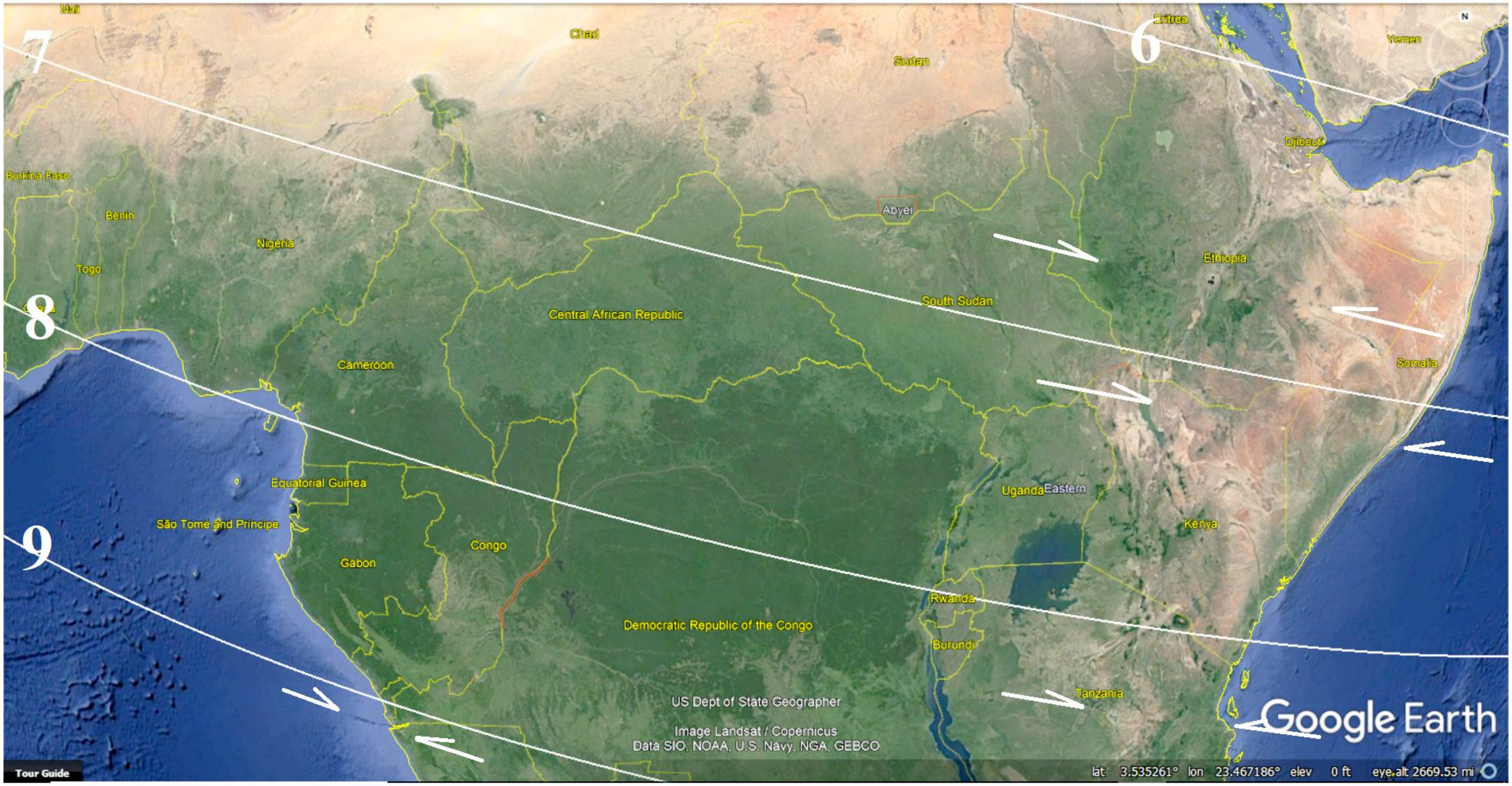


Figure 5.22: Google Earth and GGA images of same area of CGRS 7 and associated linears in the western United States. (2015, accessed 21 April 2018.)

Central Africa

When zoomed in close on Google Earth, small topographic differences may show linears in this area. But at this altitude only the mountainous regions of Ethiopia, Kenya, and Tanzania show them, although the linear in Tanzania can be extended well into the Democratic Republic of the Congo. GGA shows significantly more trends.

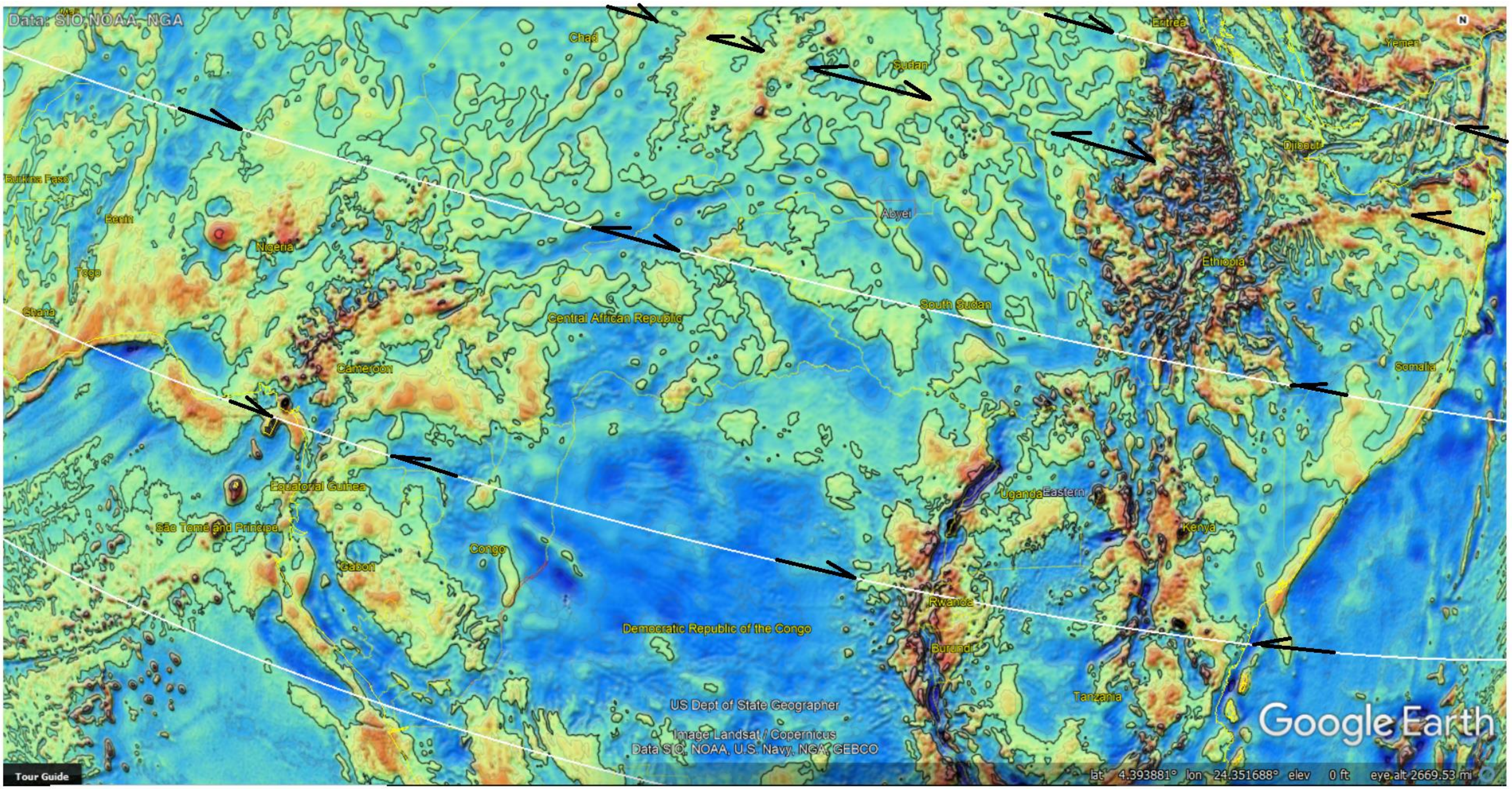


Figure 5.23: Google Earth (colored modified) and GGA image of central Africa showing more southern Pacific CGRS. (2015. 3.535261˚N, 23.467186˚E, accessed 21 April 2018.)

The blue linear from southwest to northeast, in the gravity map, and the 3 blue linears from northwest to southeast illustrate that the release-wave linears are often more distinct than the shock-wave, but around these other trends the Pacific CGRS can still be seen.

With its discussion of the Pacific CGRS, this paper just scratches the surface of Small Circle lineaments on our Globe. Truly in Gay's (2012) words, to not understand lineaments is to ignore one of the most common geomorphology indicators on our planet.

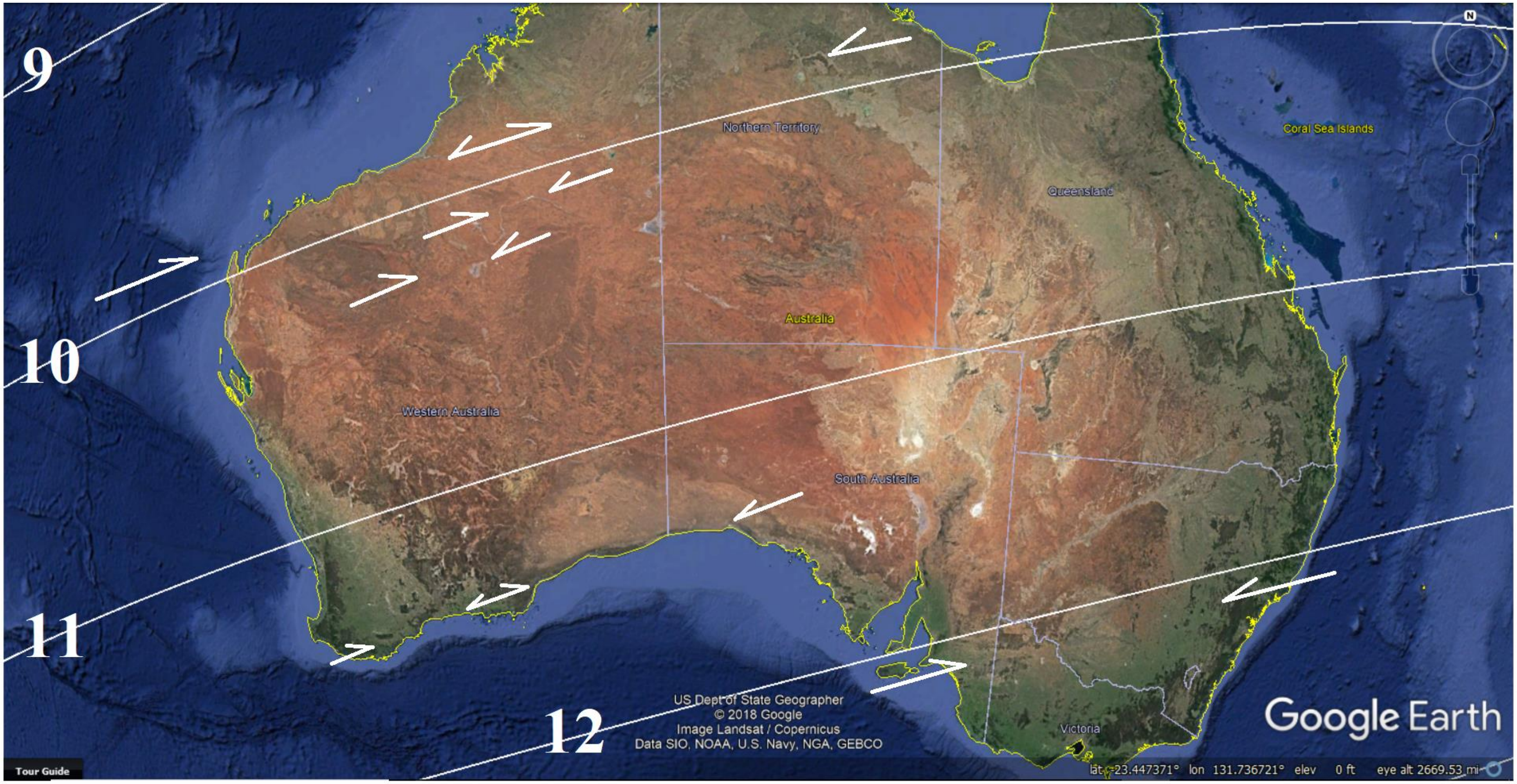


Figure 5.24: Google Earth image of Australia showing Pacific CGRS crossing and other concentric expressions. (2015, accessed 21 April 2018.)

Australia

E.S.T. O'Driscoll, a very successful mining consultant in Australia in the mid-1960s, started thinking in terms of straight and circular linears with his work in predicting minable mineral deposits in Australia (see Chapter 2). In 1980 he mapped two pairs of lineaments globally, and in 1986 he produced the first map of a continent, Australia, on which he mapped 10 trends, only one of which (his #7 equals Pacific CGRS 12) is included here. Although he wrongly tied these trends to Plate Tectonics, it was a start. Today, Google Earth produces images he could only imagine having access to.

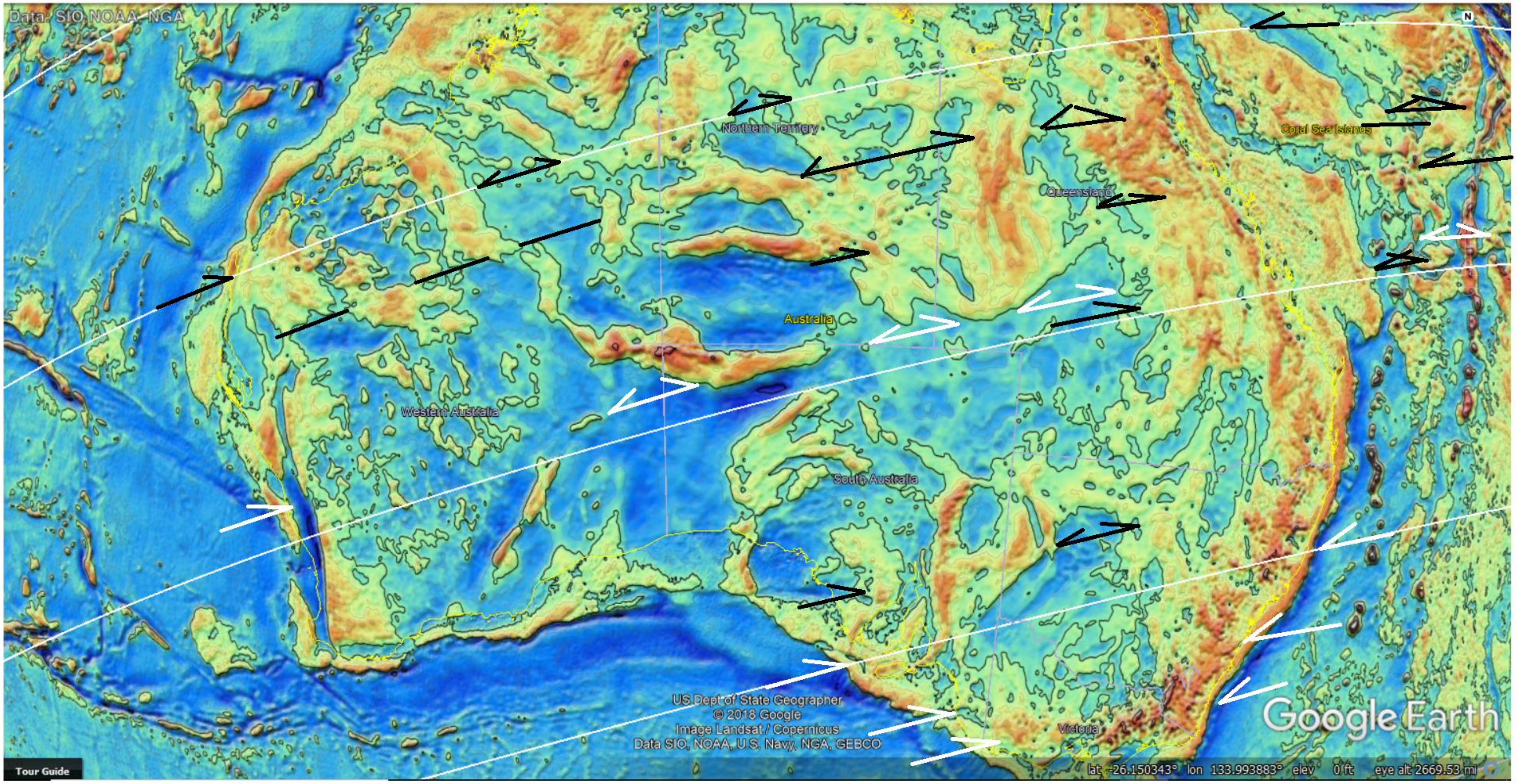


Figure 5.25: GGA overlay image of Australia showing CGRS more visible in gravity than topography. (2015, accessed 21 April 2018.)

While Australian topography shows few obvious lineaments to the Pacific CGRS, gravity maps show many more. Figure 5.25 shows some of the more obvious.

Discussion

This entire chapter has emphasized helping the reader visualize and see lineaments around the globe. The question is will you, the reader, continue to think these lineaments are part of imaginary seeing or something real? And if they are real, do they have some kind of connection, or is that appearance only a coincidence?

Interpreting the data of gravity maps at a global scale is an open question. Because gravity map data does not conform to present ideas, most writers do not know what to do with it. Here is a summary of many of the present ideas, with my response in brackets at the end of each.

1. Mahan et al (2012) thought xenoliths might be responsible for seismic structures. [He offers no source for their ubiquitous occurrence, nor offers any reason for their presence.]

2. Colli et al (2016) concludes while considering isostatic support for topography that dynamic topography exist without a corresponding gravity signal. [Rather than this being a problem, it question the entire concept of isostasy and the concept that high mountains have deep roots, which ultimately questions the actual structure of the earth's mantle.]

3. Steinberger (2016) offers four reasons for topographic variations: "(1) variations in crustal thickness and density structures, (2) oceanic lithosphere age differences, (3) subcrustal density variations in the continental lithosphere and (4) convective flow in the mantle beneath the lithosphere." [He assumes there is a connection between topography and gravity, which Colli et al has just established there is not.]

4. Hoggard et al (2017) thought topography is determined by crustal thickness and density variation. [While this was the most commonly held position, again Colli et al established it is not topography, so I will agree with density variation in lithology.]

5. Ebbing et al (2018) cite that topography and plate tectonics do not account for gravity anomalies, and they try to tweak the gravity readings, suggesting global curvature has a significant bearing on the patterns seen. [I believe this shows convoluted reasoning as the satellite that gathered the data was constantly confronted with curvature, but it took its data from the satellite's orbital position directly over the earth. Several other authors attempted to tweak the data to allow it to agree with present models.]

While gravity data does not support present models for earth's geomorphology, I have tried to demonstrate that it can be directly related to the results of an impact history for the earth when we fully understand the mechanics of the cratering process. This will be the goal for succeeding chapters.

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