


Stability without Stasis: Re-reading Qur'anic Mountains in Light of Modern Geodynamics

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ABSTRACT:

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Qur'anic verses describing mountains in relation to the prevention of *mayd* (instability or oscillation) have generated ongoing discussion concerning their possible relationship to contemporary geodynamic models. While some modern interpretations have associated these verses with geological processes, questions remain regarding how such readings may be understood within the distinct methodological and epistemological frameworks of Qur'anic discourse and Earth science. Adopting an interdisciplinary approach, the study analyzes the semantic domain of *rawāsī* and *mayd* in classical exegesis and compares them with insights from contemporary geodynamics. The analysis suggests that the negation of *mayd* is best understood as referring to the mitigation of persistent instability rather than the absence of motion. Geological evidence suggests that orogeny, through increases in lithospheric gravitational potential energy, crustal thickening, and enhanced mechanical strength, may act as a long-term feedback mechanism that contributes to local or temporal reductions in convergence rates over multi-million-year timescales. Early Earth geodynamic models further suggest that, prior to the emergence of stable collisional mountain belts, tectonic deformation was more vertically dominated and spatially heterogeneous. Within a comparative framework, the concept of *rawāsī* may be understood as resonating conceptually with the moderating role of collisional mountain systems within tectonic dynamics. Accordingly, the verses emphasize the moderation of instability rather than the cessation of motion, a perspective that may be considered broadly compatible with modern geodynamic insights, in an analogical sense.

KEYWORDS: Qur'an and science, Scientific interpretation, Collisional Orogens, Plate Tectonic Dynamics, *Mayd*, *Rawāsī*, Vertical Tectonics.

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1. Introduction

Some researchers, drawing on recent scientific advances, have noted similarities between certain Qur'anic expressions and empirical findings (e.g., Koutb 2022; Moghaddasi 2022; Jafari 2023; Azimi et al. 2025; Moradi & Gholampourmir 2025). On the other hand, some scholars emphasize that verses addressing natural phenomena are intended primarily to highlight Divine order and wisdom as signs of creation, rather than to provide technical explanations of the physical universe (al-Dhahabi 1986, 91). Accordingly, any correlation between Qur'anic verses and science must be approached with methodological caution to preserve the text's guiding purpose, without constraining its verses to variable scientific frameworks.

A prime example of this hermeneutical challenge is the Qur'anic portrayal of mountains. Frequently mentioned across various contexts, mountains are explicitly linked in several verses (Q. 16:15; 21:31; 31:10) to the prevention of instability (*mayd*) beneath humanity, a description that invites close scrutiny of both its precise linguistic meaning and its relationship to modern geological theories:

وَأَلْفَىٰ فِي الْأَرْضِ رَوَاسِيًّا أَنْ تَمِيدَ بِكُمْ وَوَهَارًا وَسُبُلًا لَّعَلَّكُمْ تَهْتَدُونَ (النحل/ 15)

He cast in the earth firm mountains lest it should shake with you, and [made] streams and ways, so that you may be guided (Q. 16:15).

In recent decades, Qur'anic verses concerning mountains have occasionally been discussed in relation to modern geological concepts and scientific miracle interpretations. Some critiques of such interpretations argue that associating Qur'anic descriptions of mountains with contemporary geology risks retrospective correlation and oversimplification of tectonic processes (e.g., Guessoum 2011). From this perspective, mountains are generally understood as consequences of tectonic plate motion rather than primary causes of Earth's dynamic stability. These critiques further emphasize that Qur'anic descriptions of natural phenomena primarily function within theological, rhetorical, and didactic frameworks rather than serving as technical scientific explanations (Hoodbhooy 1991; Guessoum 2011). Accordingly, attempts to establish direct equivalence between scriptural language and modern scientific models may lead to methodological difficulties and to forms of overinterpretation (Edis 2007).

According to al-Ṭabarī (1985, 14:62), *mayd* signifies the Earth's agitation and motion, and mountains provide tranquility and stability conducive to human life. He interprets these verses as expressions of divine blessing and wisdom. Al-Zamakhsharī (1986, 2:598) interprets the verse as

describing the stabilization of an initially unstable Earth through the creation of mountains. Fakhr al-Din al-Rāzī (1999, 20:190) clarifies that the prohibition of *mayd* does not imply the negation of all movement or earthquakes but rather refers to preventing overall Earth instability that would disrupt human life. He argues that earthquakes involve the movement of only a limited portion of the Earth, whereas the *mayd* under discussion concerns the stability of the Earth as a whole. Tabataba'i (1996, 12:217) explains *mayd* as the Earth's swaying and disturbance, interpreting the verse to mean that God placed mountains so that the Earth would not become unstable in a way that would disrupt human life and livelihood. He (1991, 14:280) adds that the verse indicates a special relationship between mountains and earthquakes, suggesting that without mountains the Earth's crust would become unstable.

Although exegetes have sought to explain the role of mountains in Earth's stability, such interpretations are often general in nature, have not been systematically compared with geological evidence, and tend to focus on dissociating the role of mountains from earthquakes as primary agents of instability. Moreover, previous studies have not addressed the specific role of mountains in regulating plate motion or their potential relationship with Qur'anic verses.

From a geological perspective, mountains are not merely topographic features; under certain conditions, they can play an active role in tectonic plate dynamics. Geodynamic studies indicate that mountains formed through active continental collisions can measurably reduce plate velocities (Molnar & Lyon-Caen 1988; Iaffaldano et al. 2006; England & Molnar 2022). Conversely, not all mountains exert the same influence on plate dynamics. Intraplate mountains, formed by volcanic or erosional processes or lacking active lithospheric roots, cannot overcome the main driving forces of plate motion (Iaffaldano et al. 2006). Recent geodynamic studies indicate that the increase in gravitational potential energy within collisional orogenic belts, more so than in other structures, can enhance the resistance of convergent plate boundaries and lead to a measurable reduction in the velocity of tectonic plate motion, whereas intraplate or passive mountains generally do not exert a similar effect (England & Molnar 2022).

It should be noted, however, that the influence of mountains on plate motion remains a subject of ongoing discussion in geodynamics. While many researchers emphasize that large-scale plate kinematics cannot be explained solely by the presence of mountain belts and involve multiple interacting geodynamic processes, a growing body of evidence suggests that major collisional orogens can play a significant role in modifying lithospheric stress distribution and contributing to measurable variations in

plate convergence rates over geological timescales (Iaffaldano et al. 2006; Turcotte & Schubert 2014). In this context, mountains are increasingly understood not merely as passive consequences of tectonic activity, but also as important components of the broader dynamics of convergent systems.

Geodynamic studies and numerical models indicate that in the early Earth (prior to the onset of modern plate tectonics), different tectonic regimes governed lithospheric behavior and crust formation. This aligns with the higher mantle temperatures and the unstable lithospheric behavior of the Archean, suggesting that the current plate tectonic system with rigid plates and stable boundaries did not exist at that time (Korenaga 2013; Fischer & Gerya 2016; Rozel et al. 2017). This raises the question: How did plate motion differ from the present before mountains existed?

Considering the differential influence of mountains on plate motion, this study explores the connection between Qur'anic concepts of mountains as stabilizing agents and modern geological understandings. Additionally, since mountains are features that emerged over time rather than existing from the Earth's origin, the study examines and compares their effects on plate dynamics from the past to the present. Accordingly, a geological analysis of the current role of mountains in tectonic plate motion is first presented. Next, plate motions during the early Earth, when mountains did not exist, are examined. Finally, a comparative analysis of Qur'anic verses and geological evidence regarding the creation and placement of mountains on Earth is provided.

2. Geological Analysis

Contemporary geodynamic studies indicate that the Earth consists of several major internal layers, including the crust, mantle, and core. While the crust and upper lithosphere are relatively rigid, the underlying mantle behaves over geological timescales as a thermally active and mechanically ductile medium. The lithosphere is divided into tectonic plates that gradually move over the underlying mantle due to internal geodynamic processes. These plate interactions produce major geological structures such as subduction zones, earthquakes, and mountain belts. In convergent settings, crustal thickening and lithospheric deformation contribute to the formation of collisional mountain systems and deep lithospheric roots. Geological evidence further indicates that tectonic plates continue to move gradually over millions of years, demonstrating the dynamic nature of Earth's surface (Earle 2015; Barati 2022).

Recent interdisciplinary Qur'anic studies have likewise emphasized the importance of examining Qur'anic descriptions of mountains within broader geological frameworks while maintaining a methodological distinction between exegetical interpretation and scientific explanation (Barati 2022; Barati & Salimi 2024). For illustrative purposes, a simplified schematic representation of tectonic plate interaction and subduction processes, adapted from Earle (2015) and Barati (2022), is provided in Figure 1.

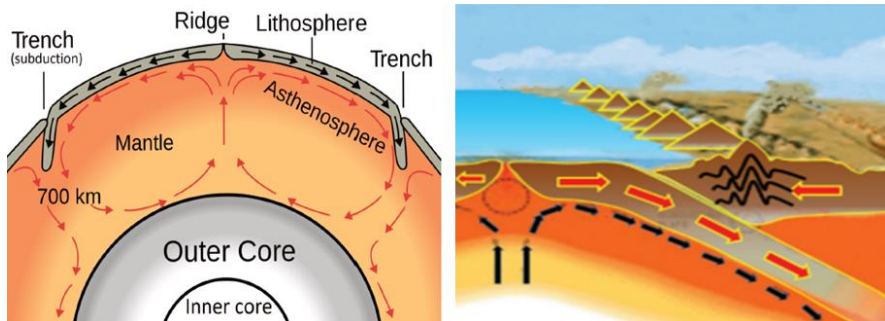


Figure 1. Simplified schematic representation of tectonic plate interaction and subduction processes (adapted from Earle 2015 and Barati 2022).

2.1. The Role of Active Collisional Mountains in Reducing Tectonic Plate Motion

Studies indicate that mountains influence tectonic plate motion through two primary mechanisms: (1) increasing gravitational load and lithospheric gravitational potential energy (GPE), and (2) enhancing the mechanical strength and rigidity of the lithosphere.

The growth of mountains is associated with the thickening of the crust and the elevation of the Earth's surface, which leads to an increase in lithospheric GPE. Studies have shown that lateral differences in gravitational potential energy (GPE) between mountainous regions and adjacent areas can generate significant horizontal stresses in the lithosphere, which numerical models typically estimate to be on the order of tens of megapascals (Molnar & Lyon-Caen 1988; Ghosh, Holt & Flesch 2009). These stresses can increase resistance to plate convergence and modify stress distribution at the plate scale, ultimately resulting in a measurable reduction in plate velocities over geological timescales of several million years (England & Molnar 1997; England & Molnar 2022).

Long-term geodynamic models that explicitly link mantle convection and lithospheric structure indicate that the surface topographic load of large mountain belts and plateaus consumes a significant part of the driving force

for plate tectonics, increasing resistive stresses at convergent boundaries and leading to measurable reductions in plate convergence rates over multi-million-year timescales (Iaffaldano et al. 2006).

Beyond gravitational effects, orogeny leads to the development of dense and deep lithospheric roots, as documented by geophysical observations and numerical models. The resulting increase in lithospheric thickness and cooling enhances the mechanical strength of the lithosphere, providing long-term support for surface topography as predicted by the “jelly sandwich” rheological model (Burov & Watts 2006). Geodynamic models demonstrate that increased continental lithospheric thickness can augment mechanical coupling with the mantle, manifesting as greater resistive forces against horizontal plate motion (Conrad & Lithgow-Bertelloni 2006). Strong lithospheric roots enhance the lithosphere’s capacity to sustain and dissipate energy associated with tectonic stresses (such as continental collision) through stable processes (e.g., flexure), rather than through rapid mechanical failure (Burov & Watts 2006).

Despite strong tectonic driving forces (e.g., slab pull), increased lithospheric resistance can significantly slow plate motion (Forsyth & Uyeda 1975; Conrad & Lithgow-Bertelloni 2002; Iaffaldano et al. 2006). In major collisional belts such as the Himalaya–Tibet, seismic and receiver-function data reveal a prominent south-dipping high-velocity interface in the upper mantle beneath northern Tibet, traceable from ~100 km to ~250 km depth, interpreted as portions of the Eurasian lithosphere underthrusting the plateau (Kind et al. 2002). This structure contributes to the long-term stabilization of the plateau by increasing the mechanical strength of the lithosphere. Enhanced strength modifies how plate convergence is accommodated, allowing stresses to be distributed over a broader lithospheric region rather than being localized at a narrow plate boundary (Molnar & Lyon-Caen 1988).

One of the strongest empirical indications of the influence of mountain building on plate motion is the temporal correspondence between the growth of major orogenic belts and a marked decrease in plate convergence rates over geological timescales. Plate kinematic reconstructions based on paleomagnetic data show that the convergence rate between the Indian and Eurasian plates declined by more than 40% between approximately 20 and 10 Ma, broadly coincident with the rapid growth of the Himalayan–Tibetan orogen (Molnar & Stock 2009). This reduction cannot be fully understood without considering the role of collisional mountains. It coincided with crustal thickening of the Tibetan Plateau, increased mean elevation, and substantial growth in regional GPE (Molnar et al. 1993; England & Molnar 2022). Similarly, geodetic data and tectonic reconstructions indicate that,

during the collision of the Arabian Plate with Eurasia, a substantial portion of the initial convergence was accommodated within the Zagros fold–thrust belt. Consequently, the effective convergence rate of the Arabian Plate was lower than its pre-collision motion (McQuarrie et al. 2003; Vernant et al. 2004). These observations indicate that the development of fold–thrust belts and crustal thickening can absorb a significant fraction of convergence internally, redistributing deformation over a broader lithospheric region rather than concentrating it solely at the plate boundary.

Another example is observed in the Andean orogeny. Reconstructions indicate that the reduction in Nazca Plate convergence relative to South America during the Miocene coincided with increased crustal thickness and elevation in the Central Andes (Iaffaldano & Bunge 2009). These observations suggest that orogeny may act not only as a consequence of plate convergence, but also as an important geodynamic feedback that can influence stress distribution and contribute to measurable reductions in convergence rates, particularly in large collisional systems.

It should be emphasized, however, that the influence of mountain belts on plate motion is understood within a broader and highly complex geodynamic system. Although mountains are not regarded as independent controls on global plate kinematics, growing geodynamic and geophysical evidence suggests that large collisional orogenic systems can significantly influence lithospheric stress distribution and contribute to variations in convergence rates over geological timescales. In this context, collisional mountain belts may be understood as important geodynamic feedbacks capable of modulating tectonic deformation and plate interactions in major convergent settings.

2.2. Vertical Tectonics in the Absence of Mountains

Modern plate tectonics is based on the horizontal motion of rigid lithospheric plates and the formation of structures such as mountain belts, subduction zones, and major fault systems. However, geodynamic evidence and geological models indicate that this tectonic regime has not prevailed throughout Earth's history. In the early Earth, high mantle temperatures and a thin lithosphere inhibited the formation of stable plates and high mountains (Korenaga 2013; Debaille et al. 2013), likely resulting in crustal deformation that was predominantly vertical and non-uniform (Bédard 2018). Vertical tectonics refers to a geodynamic regime in which uplift and subsidence of the crust dominate over horizontal displacements. These vertical movements typically occur in response to thermal and density heterogeneities within the mantle (Rey et al. 2014; Rozel et al. 2017).

Thermal models suggest that the early mantle was significantly hotter than it is today. Elevated temperatures reduced mantle viscosity and increased convective rates, such that the lithosphere could not sustain long-term horizontal stresses (Sleep 2000). During this period, the lithosphere behaved not as a rigid plate but as a viscoelastic, deformable layer, a regime often referred to in planetary geodynamics as the deformable-lid regime. This condition may have limited stable horizontal motion and promoted tectonic regimes characterized by enhanced vertical displacement (Bercovici & Ricard 2014).

One proposed mechanism for vertical tectonics involves the upwelling of hot mantle material, which caused thermal expansion and crustal uplift. Subsequent cooling and increases in density led to widespread subsidence. These uplift–subsidence cycles, repeated over millions of years, controlled the dominant pattern of crustal deformation (Sleep 2000; Bédard 2018; Foley 2018).

In tectonic regimes where stable mountain belts and thick lithospheric roots were likely absent, isostatic balance was primarily maintained through vertical movements of the thin crust. Changes in crustal mass, particularly those associated with extensive magmatic activity, could produce more efficient and dynamically responsive vertical adjustments than those observed at present (Sleep 2000; Rey et al. 2014). Dome–greenstone structures in Archean cratons are often interpreted as evidence of vertical tectonics. In these models, lighter and hotter materials rose to form domes, while denser units were displaced laterally and downward, without involving continental collisions or classical orogeny (Thébaud & Rey 2013; Roberts & Tikoff 2021).

The relative scarcity of extensive fold–thrust belts and deep lithospheric roots in ancient rocks has been interpreted by some researchers as suggesting that stable, high mountain belts were less developed or absent during parts of early Earth history (Korenaga 2021), and that deformation was predominantly vertical and localized. With the gradual cooling of the Earth, the lithosphere became thicker and mechanically stronger, enabling the concentration of horizontal stresses, the formation of stable plate boundaries, and, eventually, the development of mountains. Many studies suggest that this transition occurred gradually and likely episodically (O'Neill et al. 2007).

It should be noted, however, that the nature of tectonic processes on the early Earth remains an active subject of debate. While many geodynamic models support the existence of tectonic regimes characterized by enhanced vertical deformation prior to the stabilization of modern plate tectonics, the

timing, extent, and global prevalence of such regimes remain uncertain. Similarly, the relationship between lithospheric stabilization, mountain building, and the emergence of sustained horizontal plate motion is interpreted differently across competing geodynamic models. Accordingly, connections between early tectonic evolution and the later development of stable mountain belts should be understood as interpretive and model-dependent rather than as definitively established.

3. Comparative Analysis

This study adopts an interdisciplinary and comparative methodology that integrates semantic analysis of Qur'anic terminology with selected concepts from contemporary geodynamics. The aim is not to establish direct scientific equivalence between Qur'anic expressions and modern geological theories, but rather to explore possible conceptual correspondences between the two domains while maintaining their distinct epistemological frameworks.

The first component of the methodology involves a semantic analysis of key Qur'anic terms, particularly *rawāsī* and *mayd*, through an examination of classical Arabic lexicons and exegetical traditions. This analysis focuses on the semantic range and conceptual function of these terms within Qur'anic discourse, rather than treating them as technical scientific terminology. The second component employs a comparative epistemological approach. Qur'anic discourse and geodynamic models are understood as belonging to different systems of knowledge, each with distinct aims, methods, and modes of explanation. Accordingly, the study does not assume that scriptural language provides empirical geological descriptions in the modern scientific sense. Finally, the comparison developed in this article is based on analogy rather than equivalence. Similarities between Qur'anic descriptions and geodynamic concepts are therefore interpreted as conceptual or functional resonances, not as exact scientific correspondences. This distinction is especially important in avoiding retrospective or reductionist readings of the text.

3.1. The Concept of *Rawāsī* and the Regulation of Plate Tectonics

3.1.1. Semantic Analysis of the Term *Rawāsī*

In the Qur'an, mountains are described using the term *rawāsī*. This expression appears in verses that emphasize the placement of mountains to prevent the instability of the Earth. Linguistically, *rawāsī* is the plural of

rāsīyah, derived from the Arabic root R-S-W, which denotes firmness, stability, and being firmly established (Ibn Manẓūr 1994, 14:321).

A structural analysis of the term indicates that *rawāsī* is an adjective rather than a proper noun. Consequently, the word inherently conveys the attribute of “stability” rather than the precise physical characteristics of a mountain. In other words, classical lexical and exegetical sources associate the term *rawāsī* with mountains characterized by firmness and stability (Ibn Manẓūr 1994, 14:321; al-Zamakhsharī 1986, 4:187; al-Ṭabarī 1985, 14:62). From a lexical and semantic perspective, *jibāl* functions as a general term for mountains, whereas *rawāsī* emphasizes qualities of firmness and stability associated with certain mountains. This distinction indicates that, in classical Arabic usage, there was a clear differentiation between *jibāl* as a generic term for mountains and *rawāsī* as an adjective for those with stabilizing qualities.

In the Qur'an, the term *rawāsī* consistently appears in contexts that negate *mayd* (oscillation or instability) of the Earth. This semantic association suggests that *rawāsī* refers to mountains associated with firmness, stability, and steadfastness within the Qur'anic linguistic and conceptual framework. The selective use of the term *rawāsī* in contexts related to the prevention of *mayd* suggests that the Qur'anic discourse does not treat all mountains identically, but instead emphasizes particular mountains associated with firmness and stability.

3.1.2. Comparative Epistemology and Geodynamic Interpretation

As discussed in section 2, recent geodynamic studies suggest that active collisional mountains can play a significant stabilizing role within plate tectonic systems by acting as long-term resistive feedbacks on plate motion. As shown in previous sections, the growth of orogenic belts influences plate kinematics through two primary and complementary mechanisms: (1) increasing lateral gradients in the lithosphere's gravitational potential energy (GPE), which generate large-scale horizontal stresses opposing convergence, and (2) enhancing the mechanical strength and rigidity of the lithosphere through crustal thickening and the development of deep, cold isostatic roots. Together, these processes increase lithospheric resistance, redistribute deformation over broader regions, and can lead to measurable reductions in plate convergence rates over multi-million-year timescales.

From a geodynamic perspective, had the Earth lacked mountains and their lithospheric roots, stresses generated by plate-driving forces, such as slab pull, would have been less effectively redistributed. In major collisional systems, mountain belts function as regulatory components within

lithospheric dynamics, enhancing resistance and reducing stress localization. These processes can redistribute deformation over broader regions, contribute to long-term lithospheric stability, and, under certain geodynamic conditions, lead to measurable reductions in plate convergence rates over geological timescales, rather than halting plate motion altogether.

3.1.3. Analogy Rather Than Equivalence

From a comparative perspective, these findings may be understood as conceptually resonating with the Qur'anic description of mountains as *rawāsī*. In this framework, the comparison does not imply that the Qur'anic term functions as a technical geological concept; rather, it suggests a functional analogy between the stabilizing imagery associated with *rawāsī* in Qur'anic discourse and the moderating influence that large collisional mountain systems may exert within lithospheric dynamics.

In the verses examined in this study, the Qur'an employs the verbs *ja'ala* and *alqā* to describe the placement of mountains upon the Earth. At first glance, the expression *alqā* (to throw) may appear difficult to reconcile with modern geological theories that understand mountains as the result of gradual tectonic processes. The verb *alqā*, derived from the root L-Q-Y, fundamentally denotes facing and encountering something (al-Rāghib al-Iṣfahānī 1992, 745), whereas in its transitive form it conveys meanings such as throwing, placing, establishing, or setting (Mustafawi 1981, 10:227). Since the Qur'an employs both *alqā* and *ja'ala* in parallel contexts describing the placement of *rawāsī*, the two verbs may function synonymously in this context (al-Rāzī 1999, 20:191). At the same time, the choice of *alqā* may carry an additional semantic nuance, suggesting that the establishment of mountains involves processes of displacement and emplacement. Accordingly, the Qur'anic use of *alqā* may be understood as conceptually compatible with the gradual tectonic processes associated with mountain formation, including lithospheric displacement and plate interaction, without implying a literal or instantaneous geological event (QELNET n.d.). Accordingly, Qur'anic descriptions referring to mountains as having been "placed" upon the Earth may be interpreted in a manner that is not inconsistent with the gradual emergence of mountain systems through tectonic interactions.

3.2. Conceptual Link between Vertical Tectonics and the Qur'anic Term *Mayd*

3.2.1. Semantic Analysis of the Term *Mayd*

The verb *tamīda*, derived from the root M-Y-D, primarily denotes movement accompanied by instability, swaying, oscillation, inclination, or loss of equilibrium (Ibn Fāris 1983, 5:288; Ibn Manẓūr 1994, 3:411–412), rather than motion in itself. Accordingly, the noun *mayd* refers to the resulting condition of persistent disequilibrium, whereas the verb *tamīda* denotes the occurrence of such unstable or unbalanced motion. Al-Ṭabarī (1985, 14:62) explains *an tamīda bikum* as the Earth's inclination and agitation that would disrupt those living upon it, comparing it to the rocking of a ship that induces dizziness in its passengers. Likewise, al-Zamakhsharī (1986, 2:598) interprets the expression as referring to the Earth's tilting and instability. Tabataba'i (1996, 12:217) explains the phrase *an tamīda bikum* as *lest the Earth become unstable beneath you*, that is, God placed firmly established mountains upon the Earth so that it would not sway or incline to the right and left, thereby disrupting the order of human life. Thus, within the classical exegetical tradition, *mayd* denotes persistent instability or disequilibrium rather than mere motion. Accordingly, in verses that highlight the role of mountains in preventing the *mayd* of the Earth, the implication is not the complete cessation of all terrestrial movement, but rather the mitigation of instability.

3.2.2. Comparative Epistemology and Early Earth Geodynamics

As discussed in Section 2.2, contemporary geoscientific literature indicates that an Earth prior to the emergence of stable collisional mountain belts was not static; instead, it likely experienced persistent and heterogeneous tectonic deformation. Some geodynamic models of the early Earth suggest that, prior to the development of stable lithospheric plates and large collisional mountain belts, crustal deformation was dominated by vertical and cyclic processes associated with thermal and density heterogeneities in the mantle. These processes produced repeated uplift and subsidence and limited the development of long-term structural equilibrium.

During this period, the lithosphere is thought to have been thinner and mechanically weaker than in later tectonic regimes. As a result, tectonic deformation was more localized, vertically dominated, and dynamically variable. Geological structures such as dome–greenstone formations are commonly interpreted as evidence of these tectonic conditions. With the

gradual strengthening and thickening of the lithosphere, more stable plate boundaries and large mountain systems emerged, contributing to comparatively more regulated patterns of tectonic deformation and stress redistribution. In this framework, mountains are understood not as halting Earth's motion altogether, but as geological structures that contribute to moderating tectonic instability within Earth's dynamic system.

3.2.3. Analogy Rather Than Equivalence

Within a comparative framework, these geodynamic interpretations may be understood as conceptually resonating with the broader semantic field of *mayd* as a condition of instability or disequilibrium. Such a comparison does not imply that the Qur'anic term functions as a technical description of early Earth tectonics; rather, it suggests a functional analogy between the Qur'anic imagery of persistent instability and geodynamic models describing vertically dominated tectonic regimes.

A key point in this scientific–exegetical comparison is that Qur'anic discourse does not deny terrestrial motion; rather, it emphasizes the mitigation of instability and the establishment of relative equilibrium. Within this comparative framework, several broad conceptual correspondences may be identified:

- The Earth remained geodynamically active even in the absence of stable mountain systems.
- Early tectonic deformation appears to have been more vertically dominated and spatially heterogeneous.
- The emergence of major mountain belts did not eliminate tectonic motion altogether.
- Rather, collisional mountain systems may have contributed to more regulated patterns of lithospheric deformation and stress redistribution.

From this perspective, the comparison developed here should be understood as conceptual rather than as equivalent, exploring possible conceptual correspondences between Qur'anic imagery and contemporary geodynamic interpretations while preserving the distinct epistemological character of each domain.

4. Conclusion

A comparative examination of Qur'anic verses, classical exegetical

interpretations, and modern geodynamic evidence indicates that the frequently alleged conflict between the Qur'anic notion of Earth's "stability" and contemporary scientific understandings of Earth's dynamism is largely the result of reductionist and methodologically unsound readings of the religious text. Classical exegetes, consistently emphasize that the negation of *mayd* does not imply the complete cessation of terrestrial motion. Rather, it refers to the prevention of persistent structural instability that would render the Earth uninhabitable for human life. These interpretations differ from simplistic "scientific miracle" readings that portray mountains as mechanical barriers against earthquakes or plate motion; instead, classical exegetes generally interpret these verses in relation to the stability, order, and habitability of the Earth rather than as precise geological descriptions.

From the perspective of modern geodynamics, mountains, particularly active collisional orogenic belts characterized by deep lithospheric roots, play a demonstrable role in regulating tectonic plate dynamics. Through the combined effects of increased lithospheric gravitational potential energy, crustal thickening, and enhanced mechanical strength, major mountain belts impose significant resistive stresses on converging plates. Empirical evidence from regions such as the Himalayan–Tibetan system, the Zagros orogen, and the Central Andes indicates that mountain building is associated with measurable reductions in plate convergence rates over multi-million-year timescales. These observations suggest that orogeny functions not only as a consequence of plate motion but also as a long-term feedback mechanism that modulates the kinematics of the plate tectonic system.

Geological reconstructions of the early Earth further contextualize this relationship. Prior to the formation of stable mountain belts and thick lithospheric roots, the Earth was not tectonically quiescent; rather, it exhibited a state of persistent dynamic instability. In this regime, deformation was dominated by vertical tectonics driven by thermal and density heterogeneities within a hot, weak lithosphere. Cyclic uplift and subsidence, as recorded in dome–greenstone structures and related Archean formations, inhibited the development of long-lived structural equilibrium. This vertically dominated and continuously deforming system may be considered conceptually resonant with the Qur'anic notion of *mayd* as sustained imbalance and unrest, rather than as discrete seismic shaking.

Within this integrated framework, the Qur'anic concept of *rawāsī* may be interpreted, without departing from its linguistic, theological, or rhetorical context, as referring to stabilizing and regulatory elements within Earth's dynamic system. Mountains do not immobilize the Earth; instead, they redistribute tectonic stresses, reduce stress localization at plate

boundaries, and modulate the rate and mode of energy release within the lithosphere. This regulatory function enhances long-term structural stability and habitability while preserving the fundamentally dynamic nature of the planet.

Consequently, the Qur'an does not deny terrestrial motion, nor does it aim to articulate empirical geophysical theories. Rather, it emphasizes the moderation of motion and the mitigation of harmful instability. When approached with appropriate methodological caution, these Qur'anic descriptions may be read in a manner that is not inconsistent with some geodynamic concepts, including: the Earth's long-term dynamism; the predominance of vertically distributed deformation in some early tectonic regimes; the continued persistence of tectonic motion following mountain formation; and the possible role of collisional mountain systems in influencing patterns of lithospheric deformation and stress redistribution. Taken together, these observations suggest that meaningful conceptual dialogue between Qur'anic discourse and Earth sciences may be possible without conflating their distinct epistemological domains.

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