

The 300-Year Diamond Enigma

For 150 years, from the early 1700s to the 1870s, Brazil held a near-global monopoly on diamonds, supplying the royal courts of Europe when India's famed fell silent. This entire industry, which funded empires and defined luxury, was built on a geological mystery. The diamonds were not found in their primary volcanic host rock, but were scattered across thousands of kilometers of riverbeds, discovered by artisanal miners called *garimpeiros*.

The core question that has puzzled geologists for centuries remains: If the diamonds were in the rivers, where did they come from?



A River of Gems, A Mountain of Questions



- The rush began in the early 1700s near Arraial do Tijuco (modern-day Diamantina) in Minas Gerais, when gold miners panning river gravels, or *cascalho*, kept finding unusually bright crystals, sometimes using them as markers in card games.
- These were soon recognized as diamonds, sparking a rush that would see an estimated 1,666,500 carats exported to Europe between 1732 and 1771 alone.
- Unlike diamonds from other regions, which are mined from primary volcanic kimberlite pipes, virtually all of Brazil's historic production came from these secondary, alluvial deposits. The original host rocks remained completely unknown.

Clue #1: The Alluvial Trail

- ❖ The diamond trail is extensive, covering vast watersheds primarily in the states of Minas Gerais and Mato Grosso.
- **Minas Gerais:** The historic heartland, with major finds along the Jequitinhonha, Abaeté, and Bagagem rivers. The town of Diamantina became the trading hub for this immense wealth.
- **Mato Grosso:** A significant source discovered in 1746, with major deposits in the Juína region.
- **Bahia:** Became Brazil's largest producer in the second half of the 19th century, centered around the Chapada Diamantina region.
- The sheer scale of these deposits, dispersed over immense distances, deepened the enigma. How could so many diamonds be scattered so far from any identifiable source?



Clue #2: The Unique Suspects

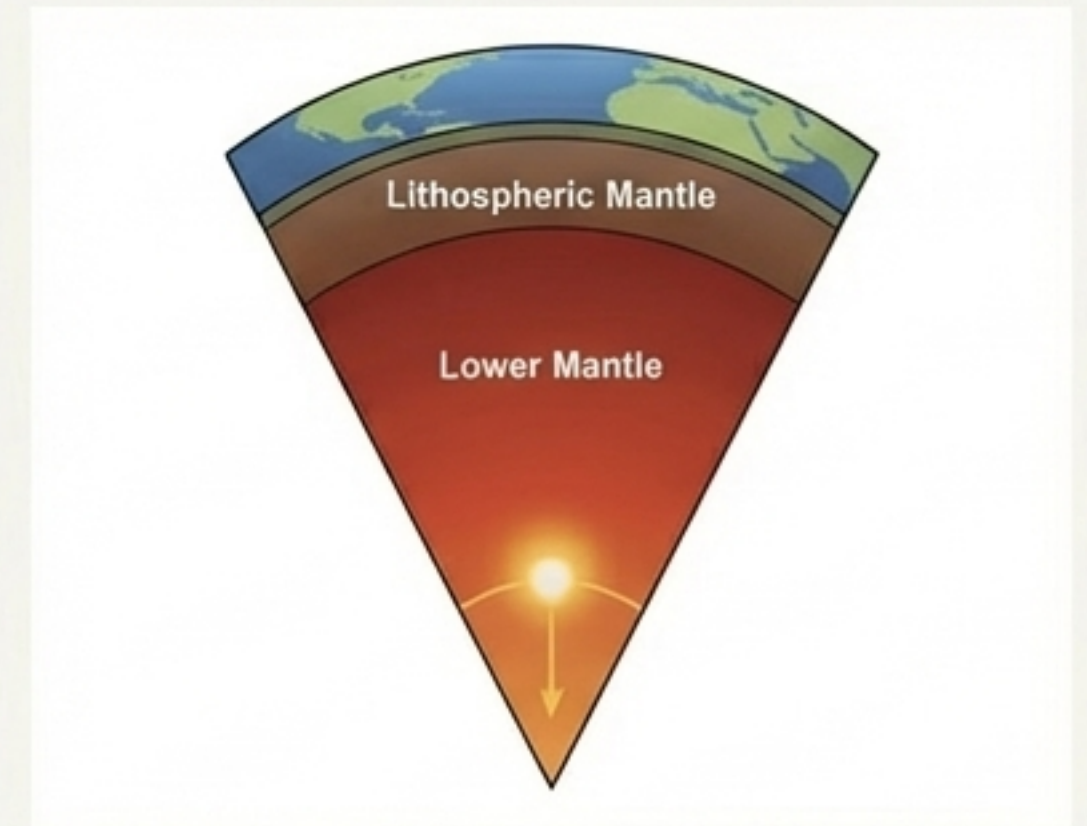
The diamonds found in Brazil are not just numerous; they are often geologically exceptional. These “unique suspects” provide conflicting clues about their origins.



1. The Giants: An unusual abundance of “megadiamonds,” crystals of extraordinary size.



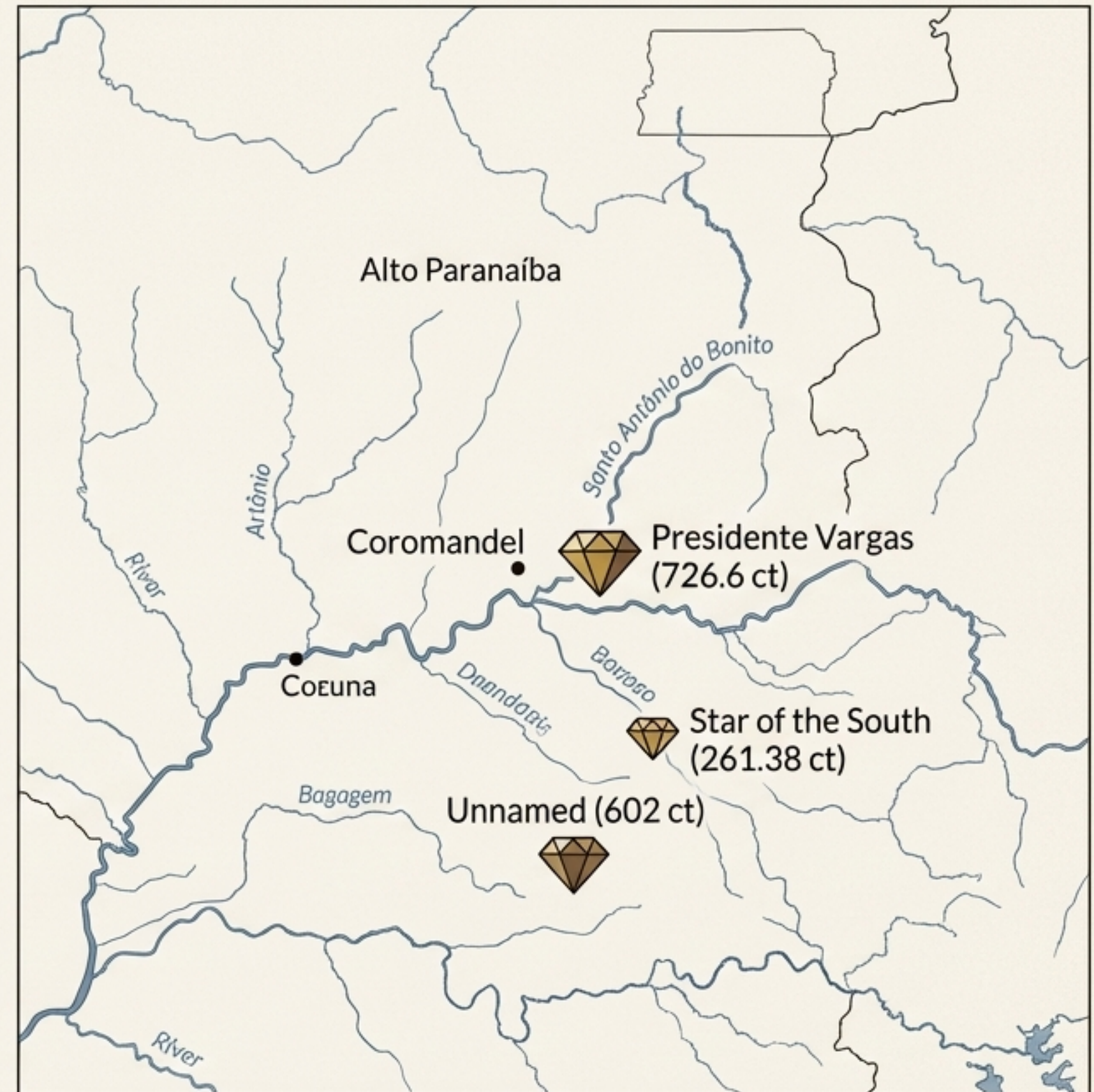
2. The Alien: Carbonado, a tough, black, polycrystalline diamond found almost nowhere else on Earth, with a controversial origin story.



3. The Messenger from the Deep: Sublithospheric diamonds containing minerals forged hundreds of kilometers deeper in the Earth’s mantle than typical diamonds.

The Giants of Coromandel

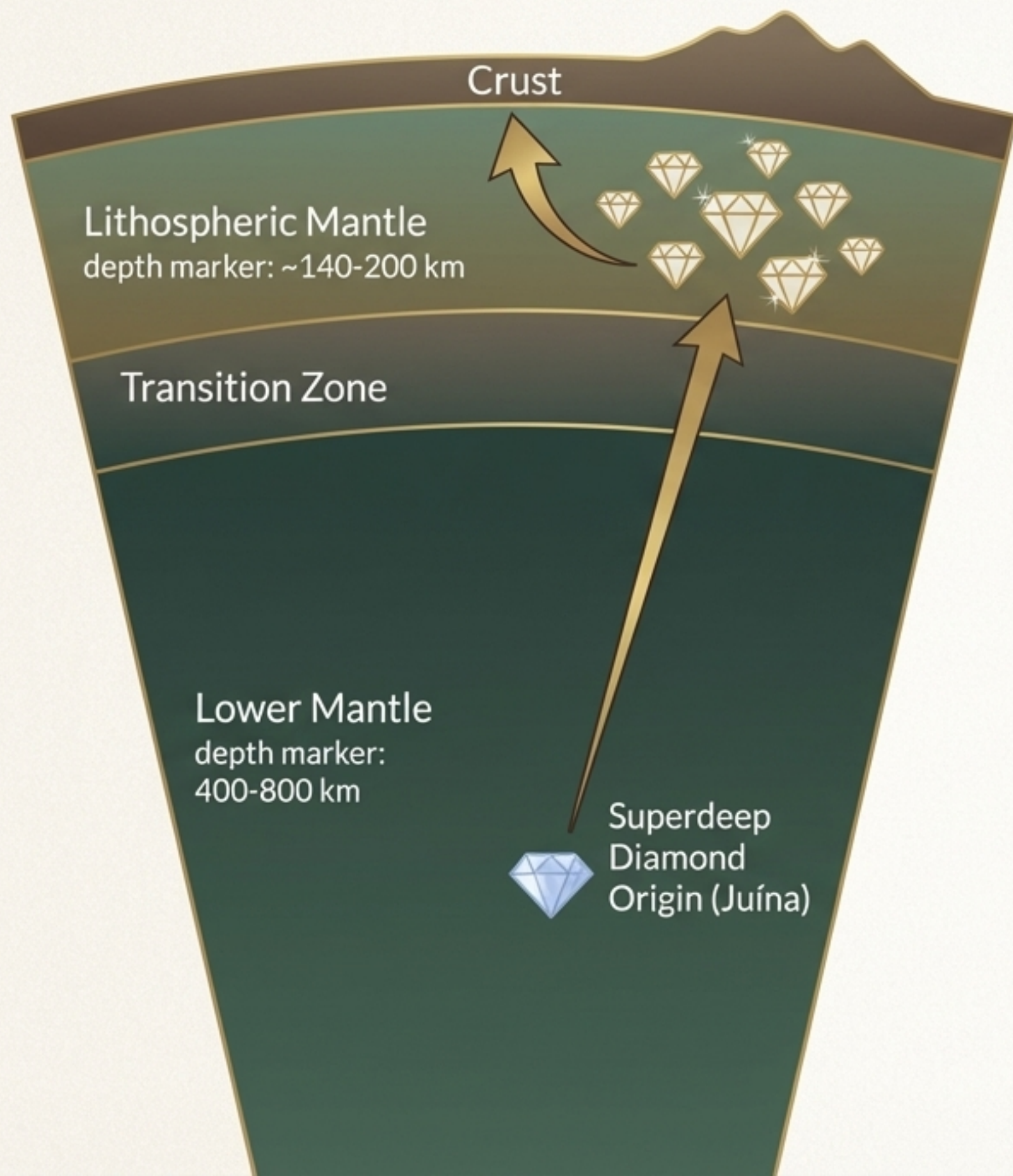
- * The Coromandel region is world-famous for its periodic discovery of exceptionally large diamonds.
- * **Presidente Vargas (1938)**: Found in the Santo Antônio do Bonito River, this gem weighed an astonishing 726.6 carats in its rough state.
- * **Star of the South (1853)**: Discovered in the Bagagem River, this celebrated diamond weighed 261.38 carats.
- * **Unnamed (1994)**: A 602 ct brown diamond, the second-largest gem diamond ever recorded in Brazil, was also found in the Santo Antônio do Bonito River.
- * The concentration of these massive, high-value gems in one alluvial region, with no obvious kimberlite source, is one of the greatest puzzles in diamond geology. The source for these giants remains elusive.





The Carbonado: A Diamond with an Alien Past?

- First discovered in Bahia around 1841, Carbonado is a polycrystalline aggregate of diamond, graphite, and amorphous carbon.
- **Unique Properties:** Opaque, porous, and free of the cleavage that makes single-crystal diamonds brittle. Its extreme toughness made it a prized industrial material in the late 19th century for drilling and abrasion.
- **The Origin Controversy:** Carbonado's formation does not fit with typical terrestrial diamond genesis (volcanic, metamorphic, or impact).
- **An Extraterrestrial Theory:** Recent evidence suggests a cosmic origin. Geoscientist Stephen Haggerty (2014) proposed that Carbonados may have formed in a white dwarf star or a supernova explosion, arriving on Earth during a cosmic bombardment billions of years ago.



Messengers from the Lower Mantle

- * In the 1990s, the Juína region of Mato Grosso yielded another geological surprise: 'superdeep' or sublithospheric diamonds.
- * These diamonds formed at depths of 400 to 800 km, far deeper than the ~140-200 km depth of the continental lithosphere where most gem diamonds crystallize.
- * They are scientific treasures, containing ultra-rare mineral inclusions (like majorite, perovskite, and periclase-wustite) that are only stable under the immense pressures of the Earth's transition zone and lower mantle.
- * Their existence proved that the carbon cycle extends deep into the planet and provided another perplexing clue: Brazil's diamonds were not just coming from one source, but from multiple, vastly different geological environments, including the deepest yet known.

The Breakthrough: The Primary Source Revealed

- * After centuries of reliance on alluvial deposits, systematic exploration beginning in the late 1960s finally located the primary source rocks for diamonds.
- * Over 1,200 kimberlite bodies—the volcanic pipes that transport diamonds from the mantle—have now been identified across Brazil.
- * These discoveries are concentrated in cratonic (stable continental crust) areas, particularly the Alto Paranaíba region (western Minas Gerais) and within the São Francisco and Amazonian cratons.
- * While most are not economically viable, this geological revelation marked a fundamental shift from a scattered, historical search to a systematic, scientific one. The hunt for the source was finally over.

The Turning Point: Brazil's First Kimberlite Mine

Then



Now



- ❖ The culmination of this new era of exploration is the Braúna 3 kimberlite pipe in Bahia.
- ❖ Operated by Lipari Mineração Ltda., it is Brazil's first and only commercial diamond mine developed on a primary kimberlite source.
- ❖ This represents a monumental change, shifting the focus from the vanishing way of life of the garimpeiro to modern, large-scale open-pit mining.
- ❖ The transition promises greater control, more accurate resource estimation, and a new chapter in Brazil's 300-year diamond history.

A New Economic Reality

The Braúna 3 Mine: By the Numbers

2.5 million carats

Resource



210,000 carats

Projected Production in 2017

US\$727 per carat

Brazil's National Average Value (2016)

The mine's initial bulk sampling averaged over US\$322/ct, placing Braúna's diamonds among the world's most valuable.



7-year

Mine Life (Open-Pit)

With potential for underground extension.

This single project is set to dramatically increase Brazil's official production, which was just 31,825 carats in 2015.

An Enduring Enigma, A Transparent Future



- ❖ Despite the discovery of kimberlites, the specific primary sources for many of Brazil's most famous historical diamonds, particularly the giants of Coromandel, remain elusive. The full story is still being written.
- ❖ However, the future of Brazilian diamonds is now rooted in a new model of large-scale, traceable mining.
- ❖ This addresses the historical challenges of smuggling, underreporting, and exploitation that were endemic to the vast, uncontrolled alluvial fields.
- ❖ As a participant in the Kimberley Process Certification Scheme (KPCS), Brazil's new industrial mines offer a transparent and regulated supply chain, a stark contrast to the past.

A New Chapter in a 300-Year Legacy

- * For three centuries, Brazil's diamonds were a story of discovery and mystery, of gems found in rivers with origins shrouded in geological debate.
- * Today, the narrative is shifting from a widely dispersed past to a concentrated, knowable future.
- * The discovery of economic kimberlites does not erase the enigmatic allure of the alluvial giants or the cosmic origins of carbonado. Instead, it adds a new, powerful chapter.
- * This is the dawn of a new era for the legendary diamonds of Brazil—one that promises to be more transparent, more valuable, and potentially even more brilliant.

