Caspian Seas

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This study belongs to comparative planetology and geodynamics. It prolongates “Geological flows” (arXiv:0811.3136v1) and “Flow dynamics of the Moon” (arXiv:1004.0450v1). Acquaintance with the above-mentioned papers is strongly recommended. Recall that geology and planetology are growed here over new conceptual basis. The new basis is high-speed fluid dynamics ant its similarity to superslow flows of solid planet surfaces. Caspian Seas, Mississippis, and Tycho Craters are new interesting objects of studying in this advanced comparative planetology. Highly unobvious relations between such flows are represented.

CONTENTS

Notations. Fig. 3 means Figure 3 from a current section. Fig. 2.3 means Figure 3 from Section 2 of this paper. [1:2, Fig. 3] means Figure 3 from Section 2 of the paper [1].

1. America and the Atlantic are antisymmetric Antarctidas

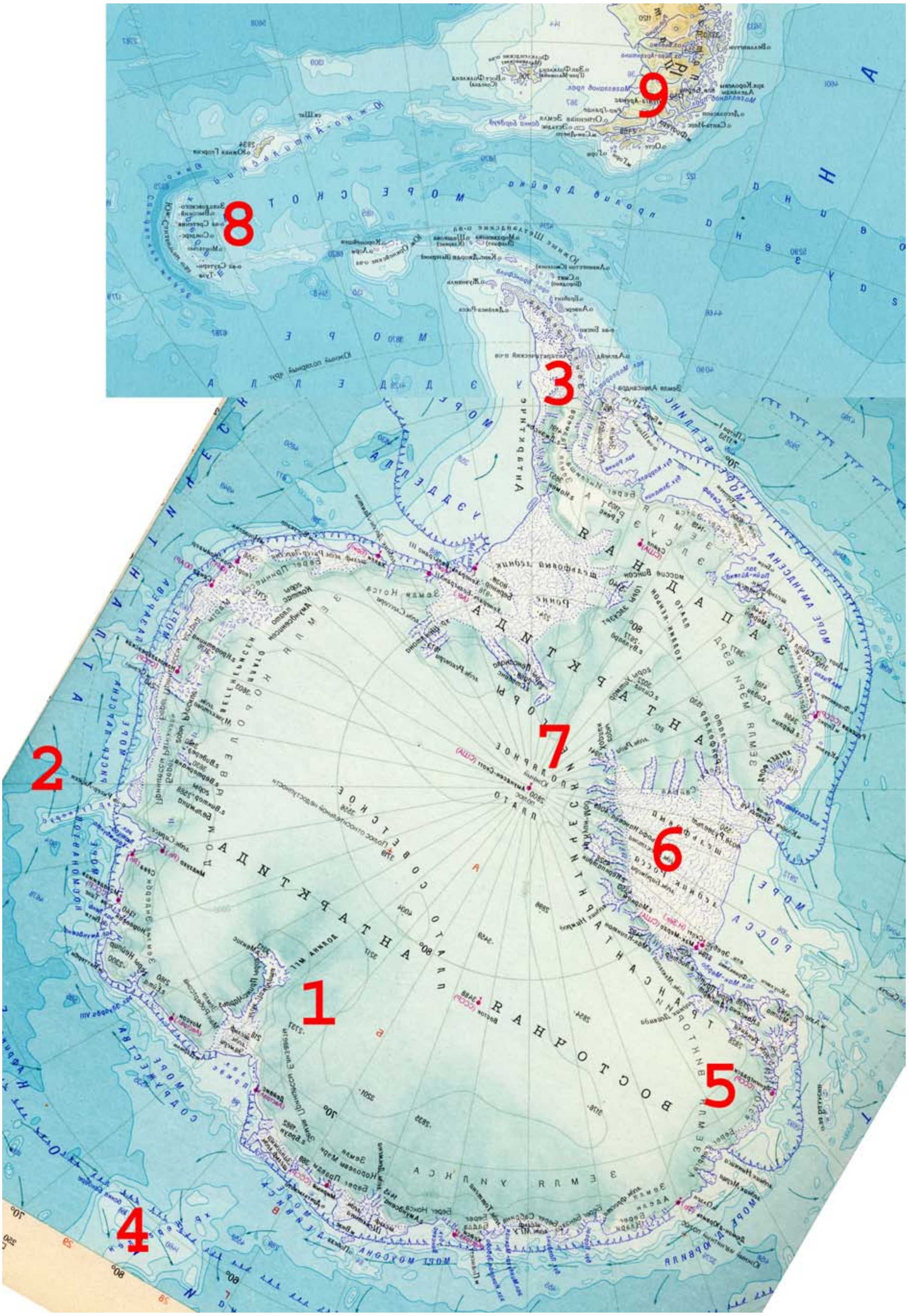

Fig. 1. Antarctida, mirrored. See [1:10]. The long shock wave of Antarctida is connected to a big continent. Note that this big continent is an Antarctida too, and the two Antarctidas have common long shock wave. See Fig. 2.

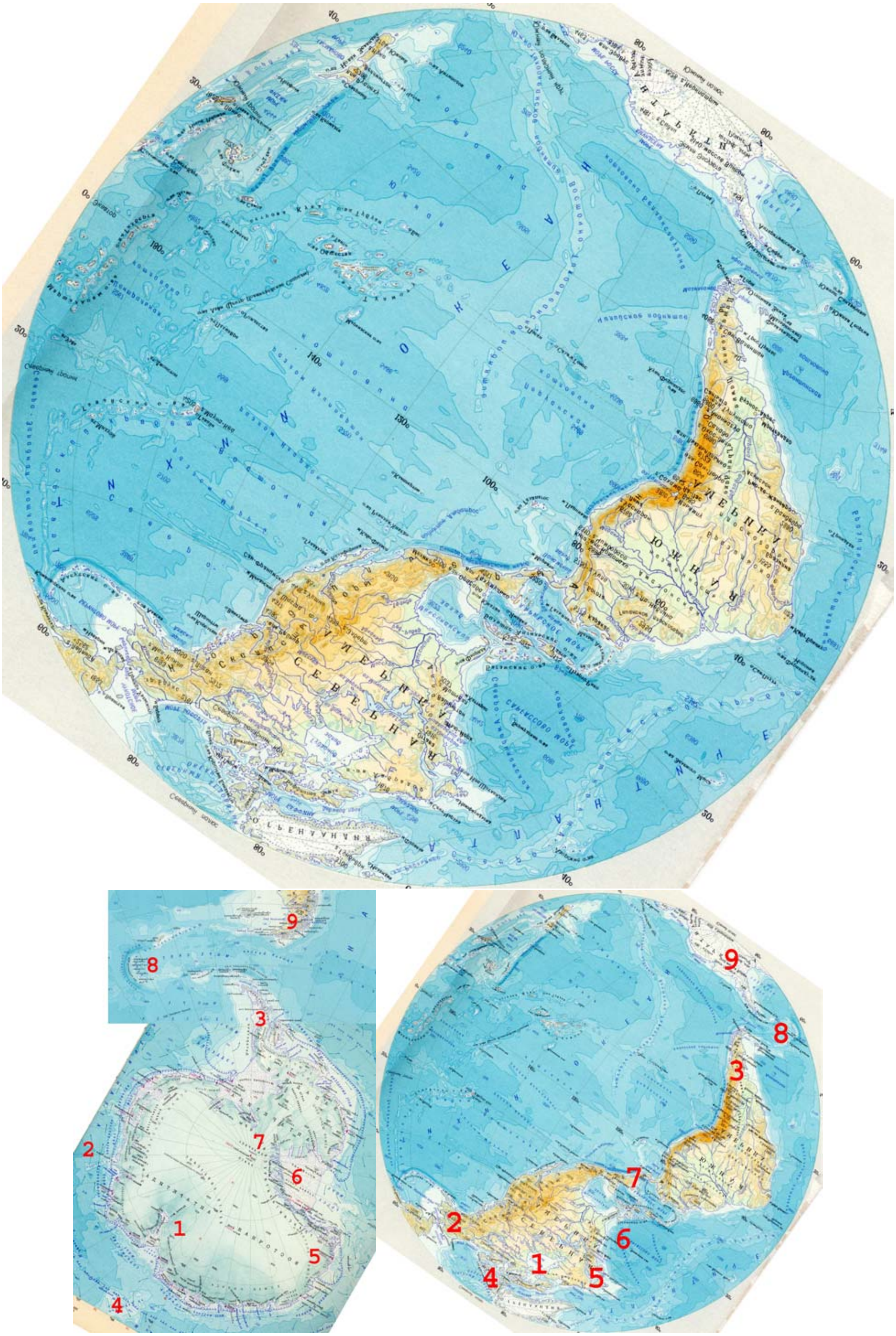

Fig. 2. American Antarctida, mirrored. The long shock wave of America is connected to Antarctida.

Fig. 3. The Bering Strait is a Panama Canal. The Alaska Peninsula is a Panama Isthmus. See Fig. 2. **Upper:** The North part of South America. **Center:** Eastern Antarctida. **Lower:** North America.

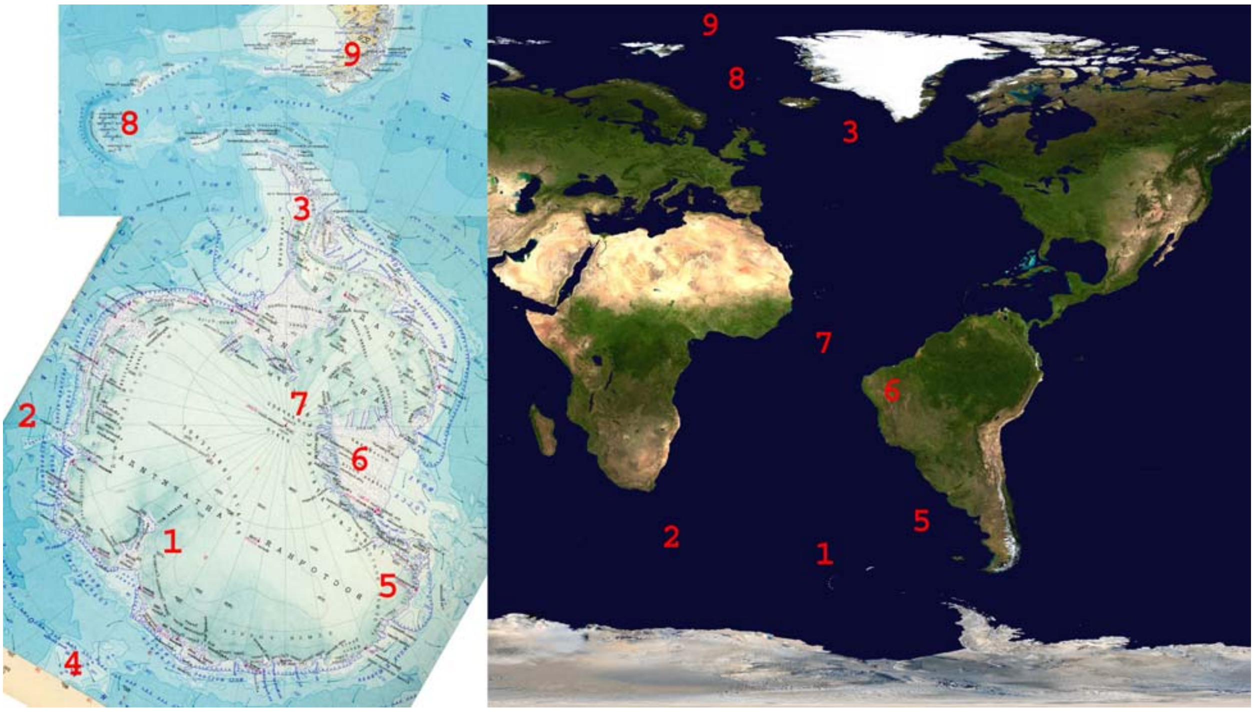

Fig. 4. The Atlantic is a convex down Antarctida (mirrored), and it's long shock wave is connected to the Arctic Ocean (it is a convex down Antarctida too [1:10, Fig. 8]).

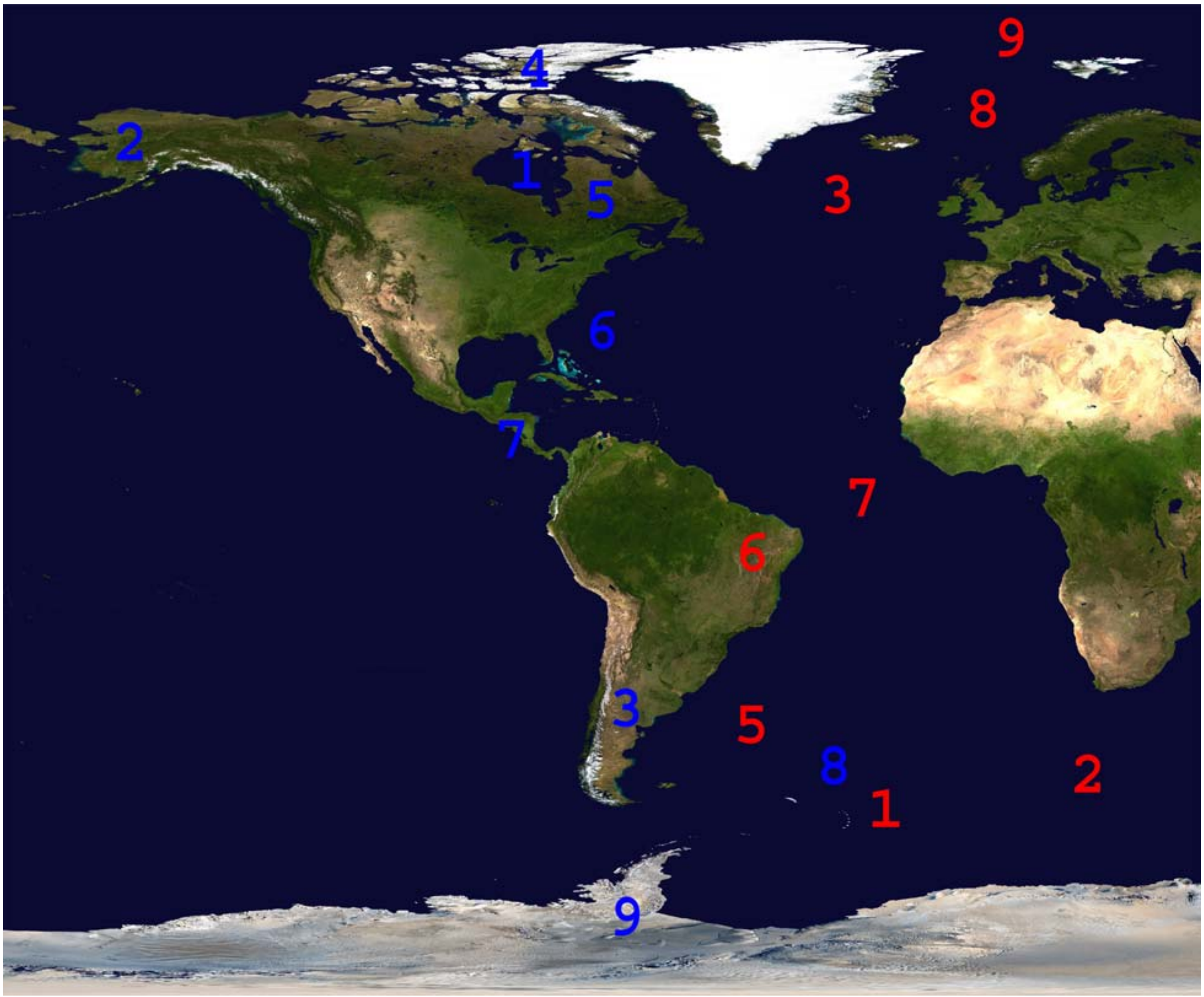

Fig. 5. America and the Atlantic are antisymmetric Antarctidas.

2. Caspian Seas

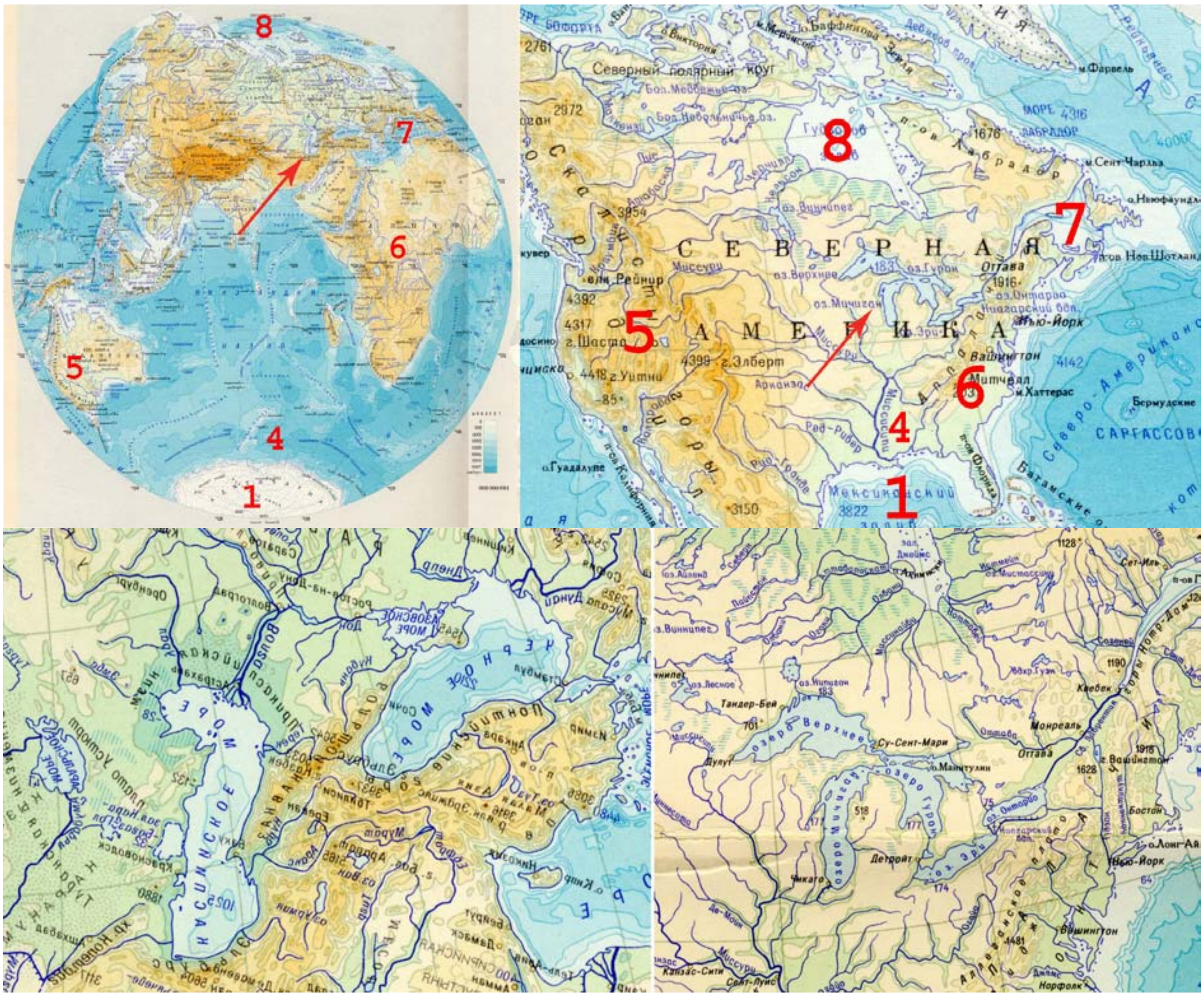

Fig. 1. By [1:10, Fig. 10] The Caspian Sea and Great Lakes (are pointed by arrows) are equivalent with respect to the given symmetry.

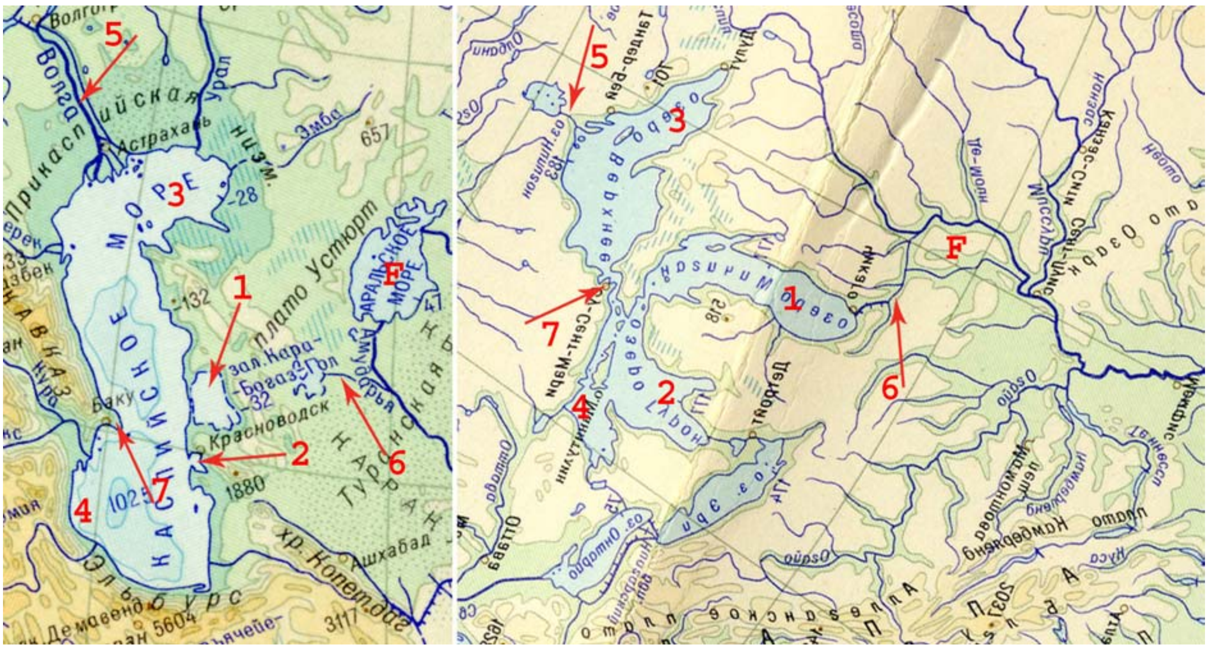

Fig. 2. Left: The Caspian Sea. **Справа:** Great Lakes (mirrored).

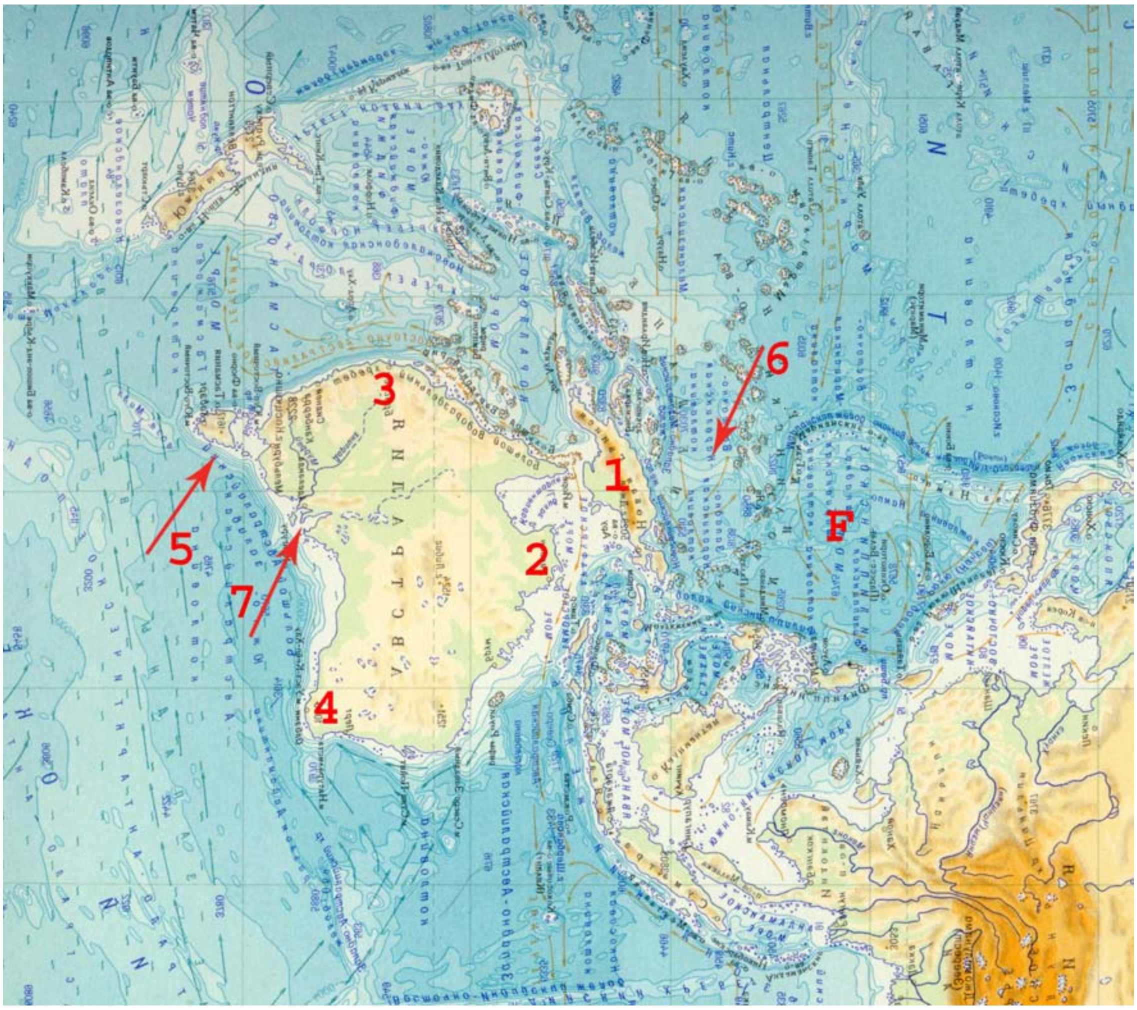

Fig. 3. Australia (mirrored). This is a convex up version of a Caspian Sea. The element F (fish) (see [1:8, Fig. 2], [1:15, Fig. 1]) corresponds to the Aral Sea [1:14, Fig. 8] and the arc of the Mississippi at the Fig. 2.

Fig. 4. Lake Baikal. See [1:8, Fig. 3], [1:15, Fig. 2, 6].

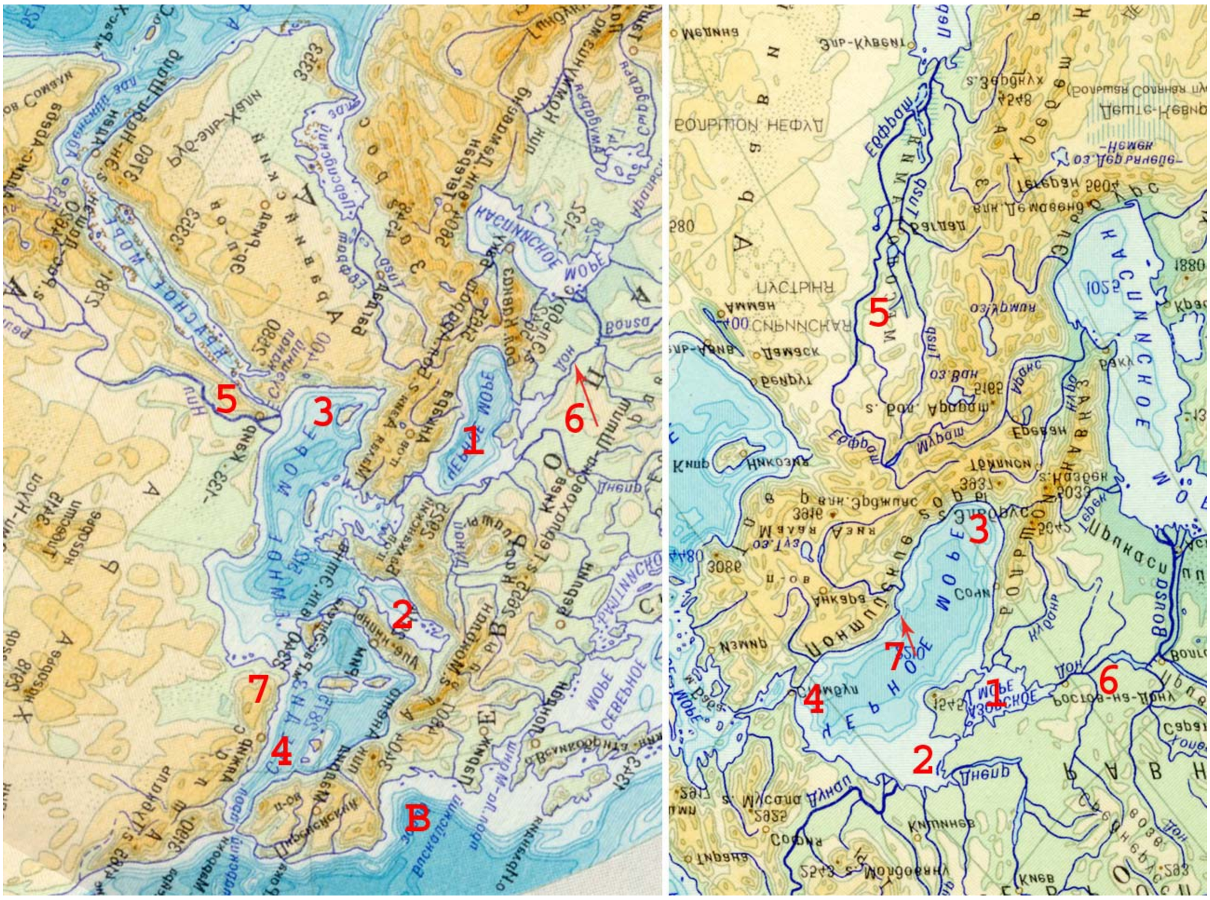

Fig. 5. Left: The Mediterranean Sea (mirrored). **Right:** The Black Sea (mirrored).

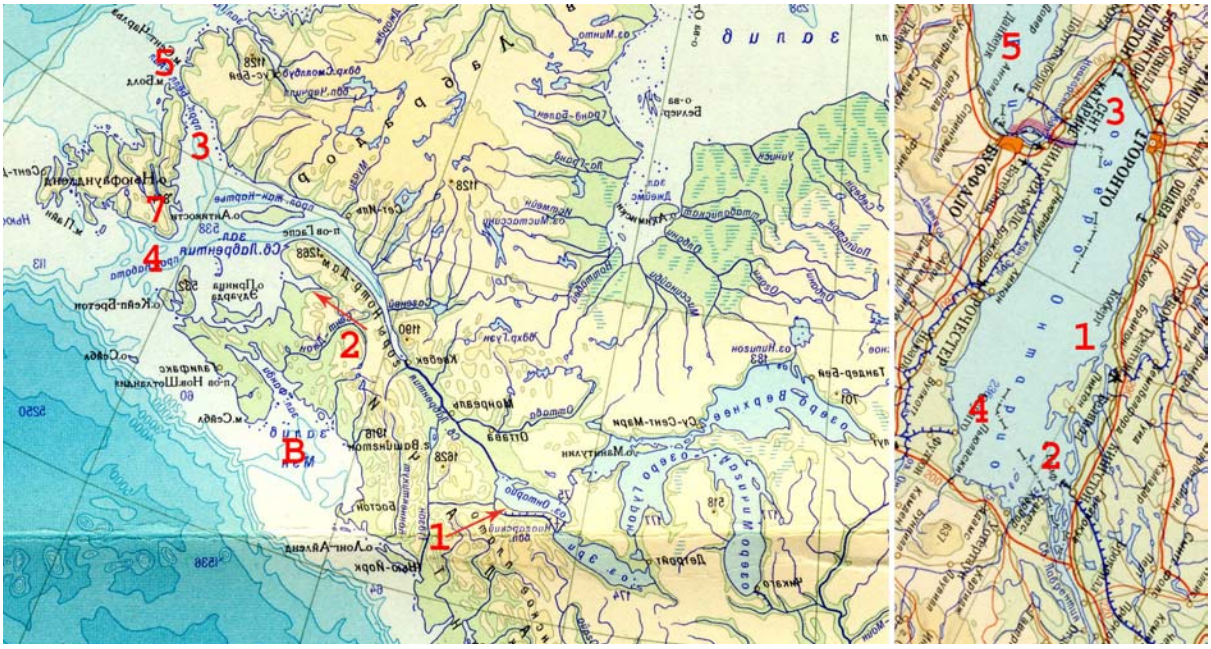

Fig. 6. At Fig. 1 the Mediterranean Sea and the Gulf of Saint Lawrence are pointed by 7 as equivalent objects. At Fig. 5, 6 they are enlarged. **Left:** The Gulf of Saint Lawrence (mirrored). Lake Ontario (element 1) is corresponded to the Black Sea (Fig. 5, left). The Gulf of Maine is corresponded to the Bay of Biscay (Fig. 5 left, element B). **Right:** Lake Ontario (nonmirrored). See the Black Sea at Fig. 5 right. Lake Erie with Niagara Falls (5) is corresponded to the Persian Gulf and Mesopotamia. Lakes Superior + Michigan + Huron are corresponded to the Caspian Sea, see Fig. 7.

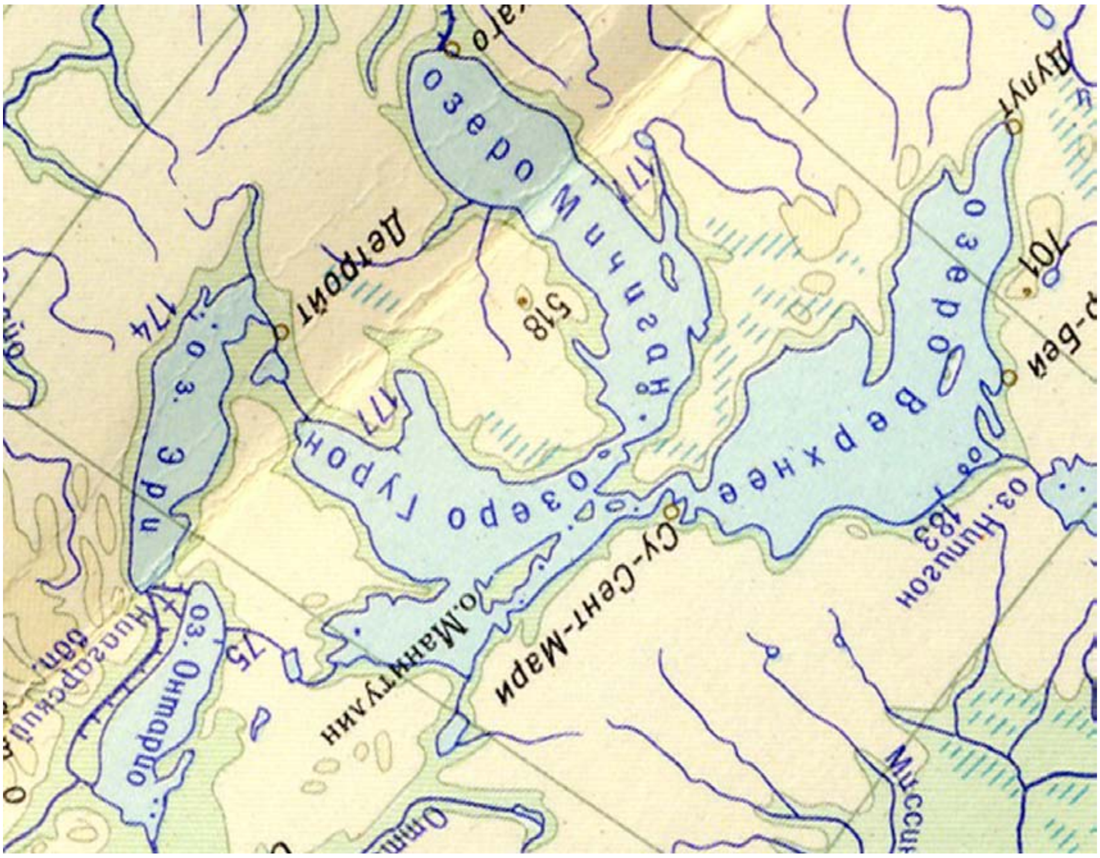

Fig. 7. An addition to Fig. 6 right. Great Lakes (nonmirrored). As Lakes Superior + Michigan + Huron are placed with respect to Lake Ontario, as the Caspian Sea is placed with respect to the Black Sea

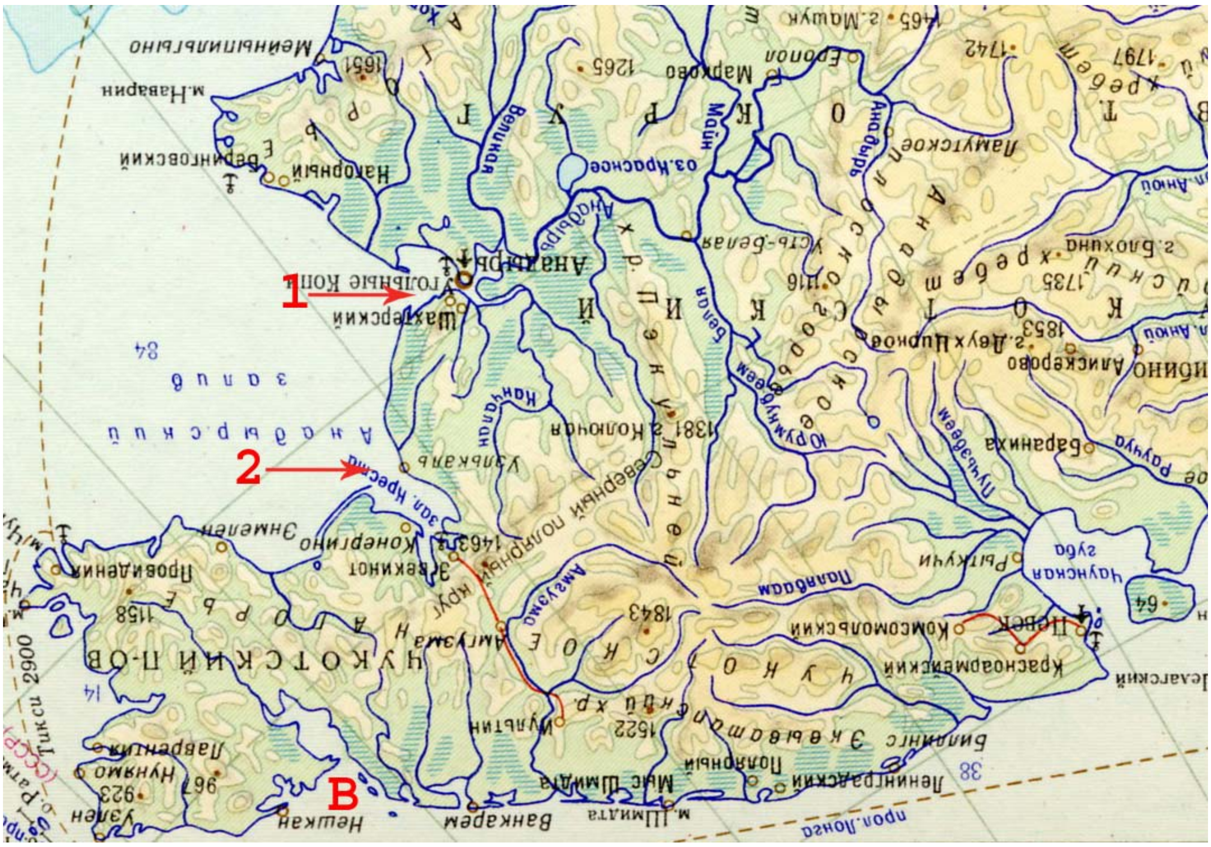

Fig. 8. Chukotka (nonmirrored). The North is down. The Gulf of Anadyr is an analog of the Gulf of Saint Lawrence (Fig. 1 right, Fig. 6 left). The element B is an analog of the Bay of Biscay (see Fig. 5, 6).

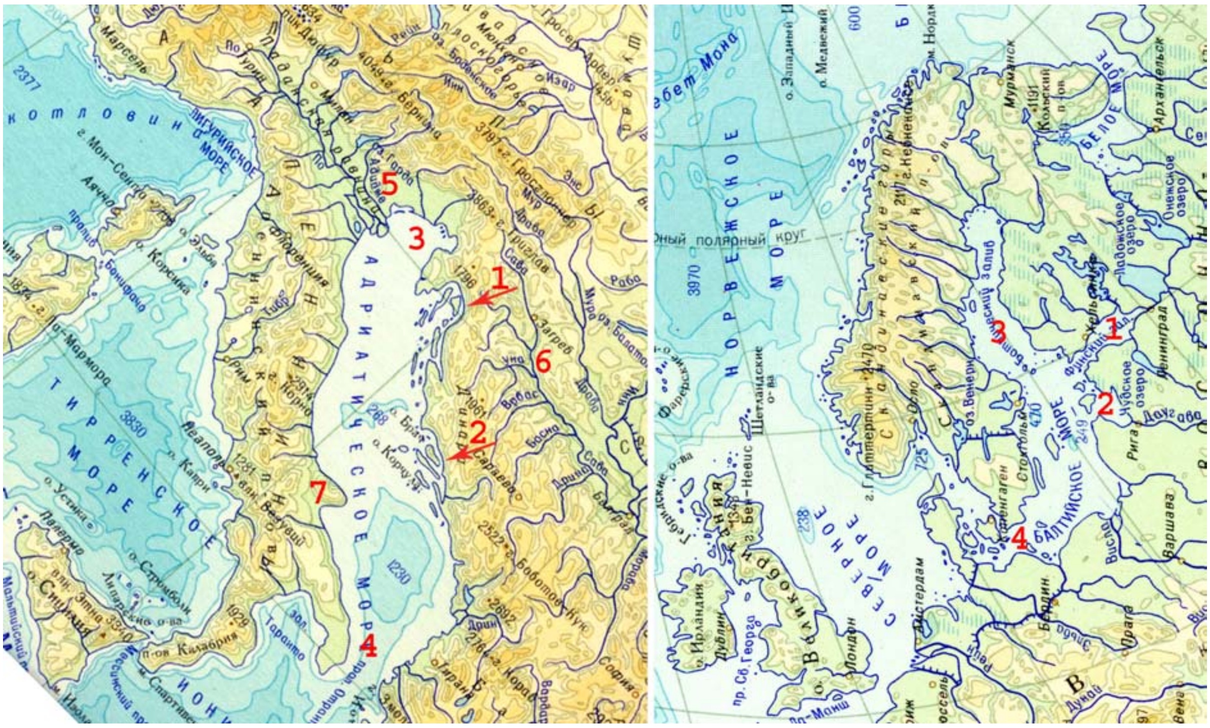

Fig. 9. Left: The Adriatic. **Right:** The Baltic. Ilaly is corresponded to Scandinavia.

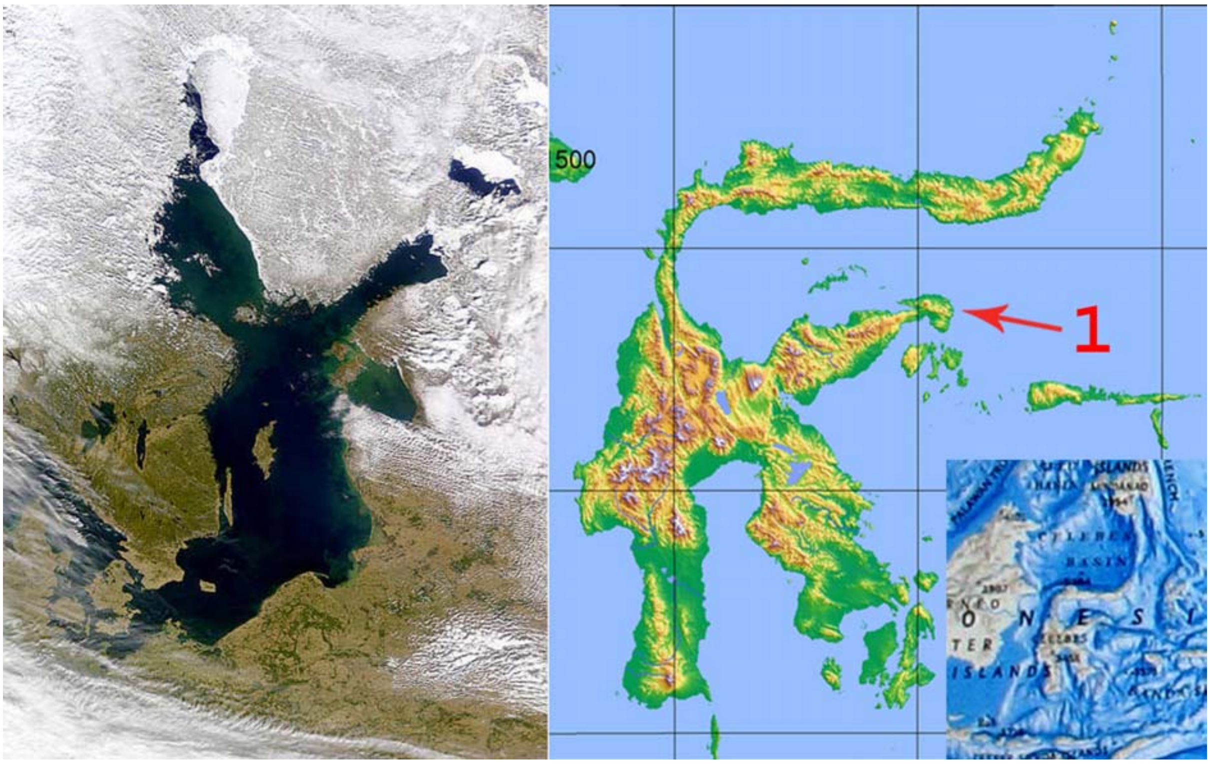

Fig. 10. Left: The Baltic in March 2000. NASA Visible Earth gallery. **Right:** Sulawesi. The end of the element (1) has typical triangles of shock waves [1:7, Fig. 3, 7], [1:16, Fig. 1-3]. It means quick moving of the end.

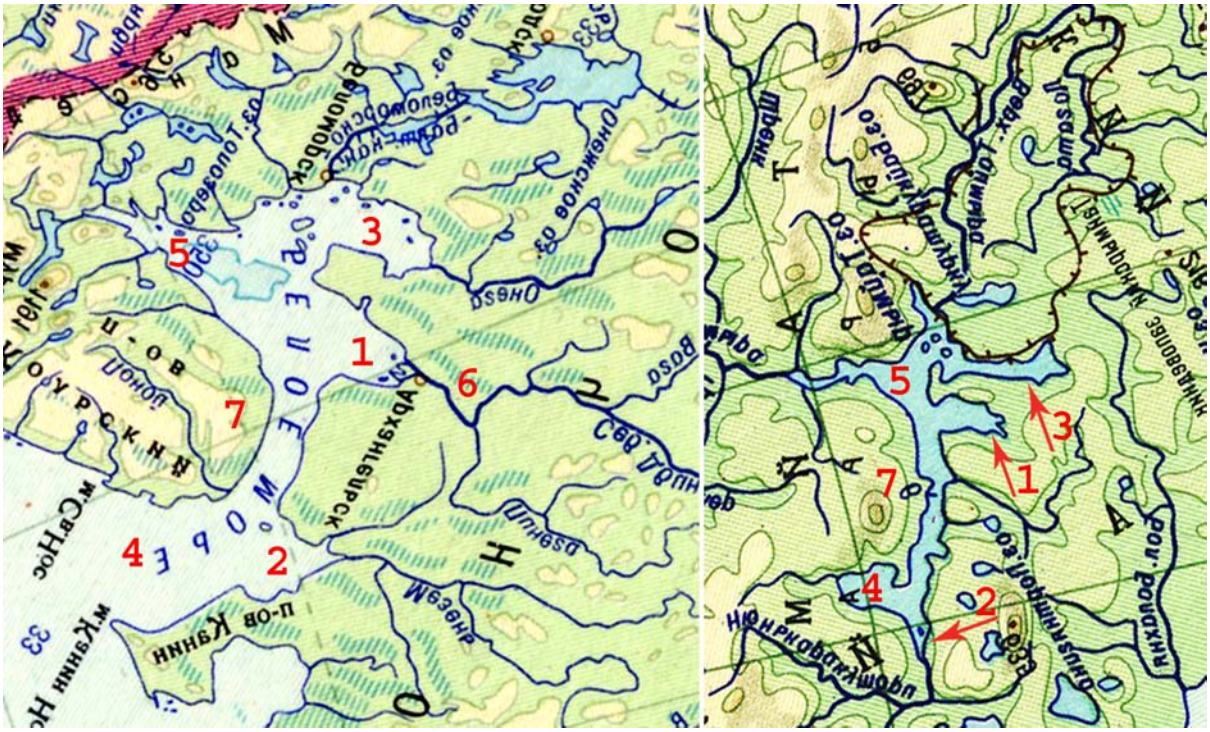

Fig. 11. Left: The White Sea (mirrored). **Right:** Lake Taymyr (mirrored). See [1:8, Fig. 7], [1:4, Fig. 22]. Compare with Fig. 4 left.

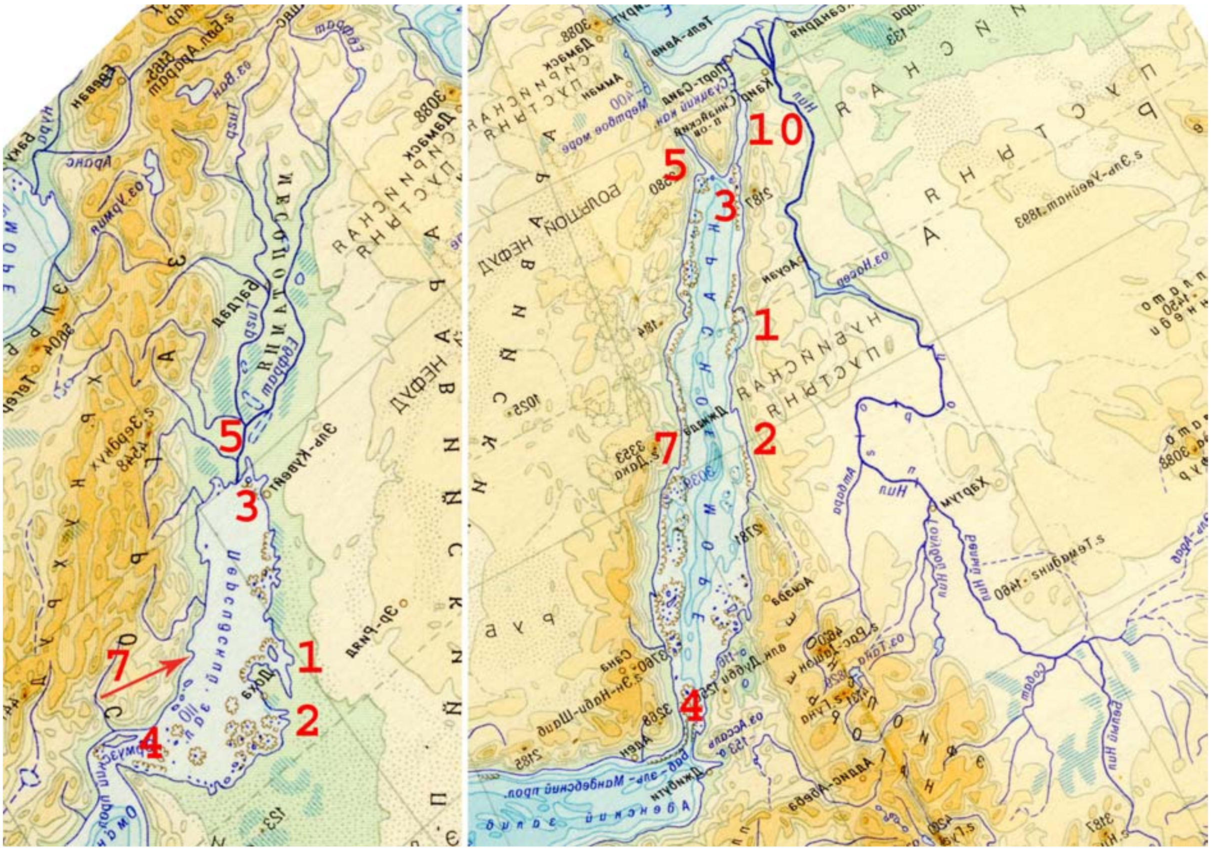

Fig. 12. Left: The Persian Gulf (mirrored). **Right:** The Red Sea (mirrored).

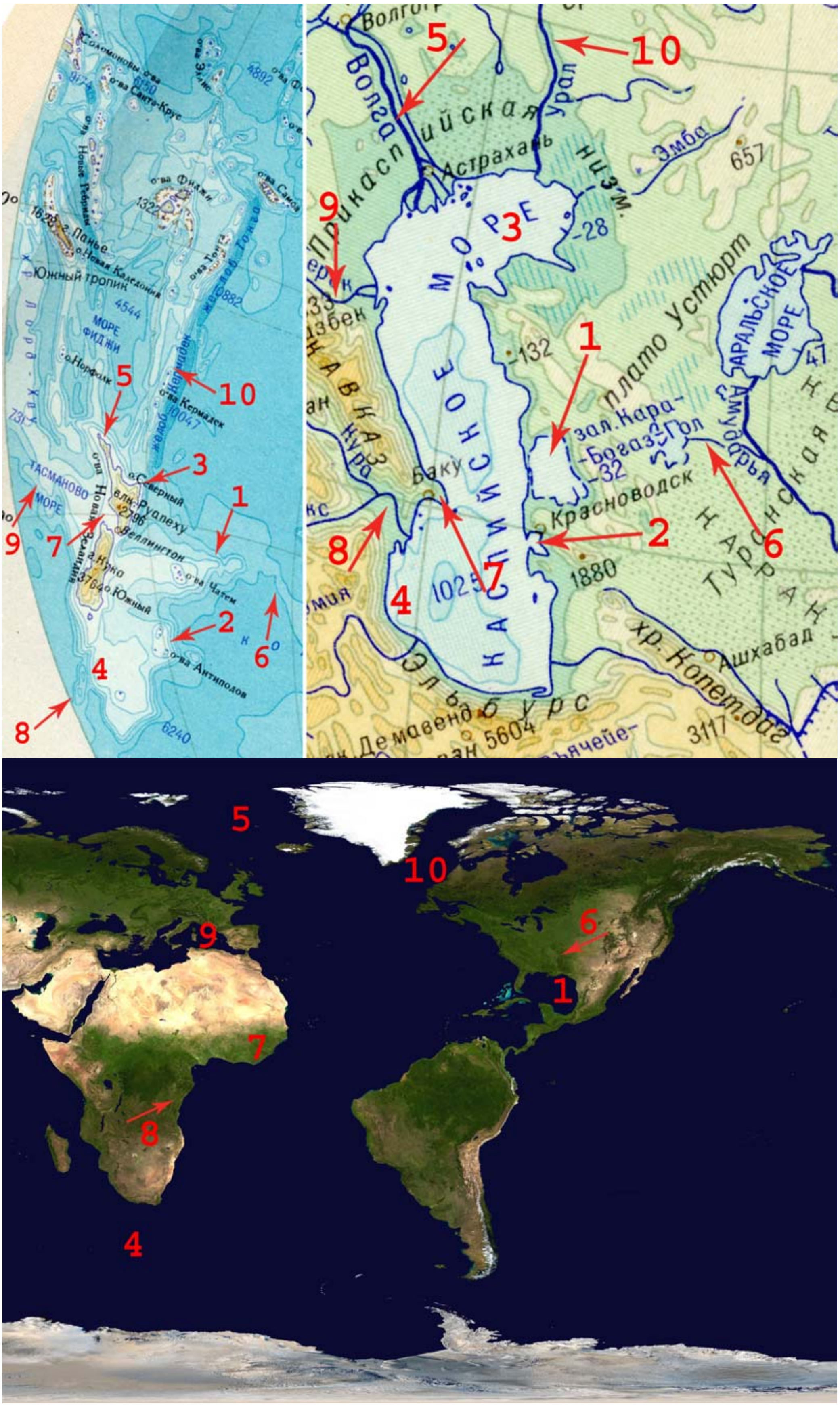

Fig. 13. Upper: New Zealand is a Caspian Sea. See [1:7, Fig. 10, 11]. **Lower:** The Atlantic (mirrored) is a Caspian Sea. Also the Atlantic is an Antarctida (Fig. 1.4). The element 6 is the Mississippi River, the element 8 is the Congo River.

3. Mississippis

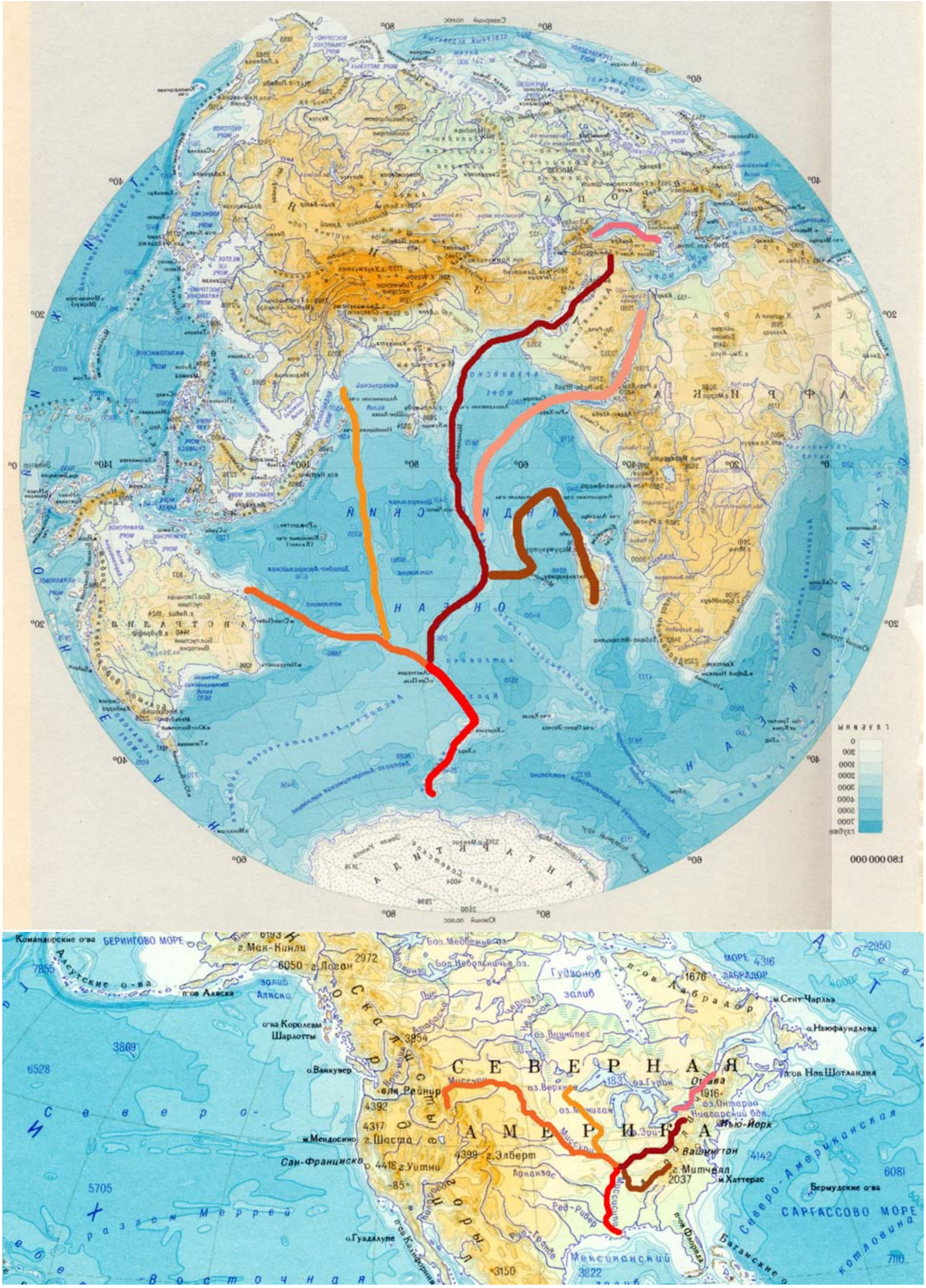

Fig. 1. There is a Mississippi in the Indian Ocean. See [1:10, Fig. 10].

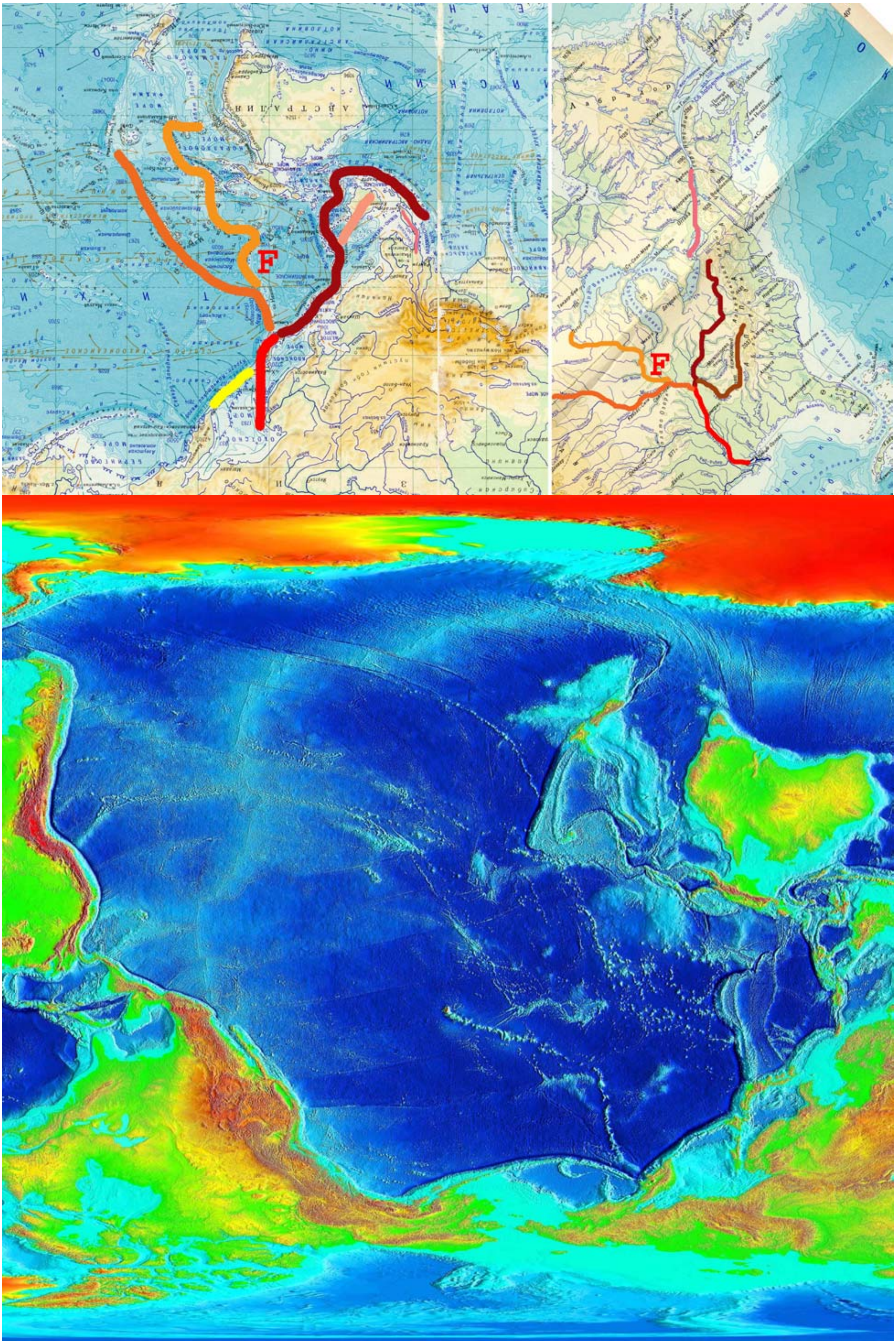

Fig. 2. Upper: The Mariana Mississippi (left). **Lower:** Ranges of the Pacific Ocean.

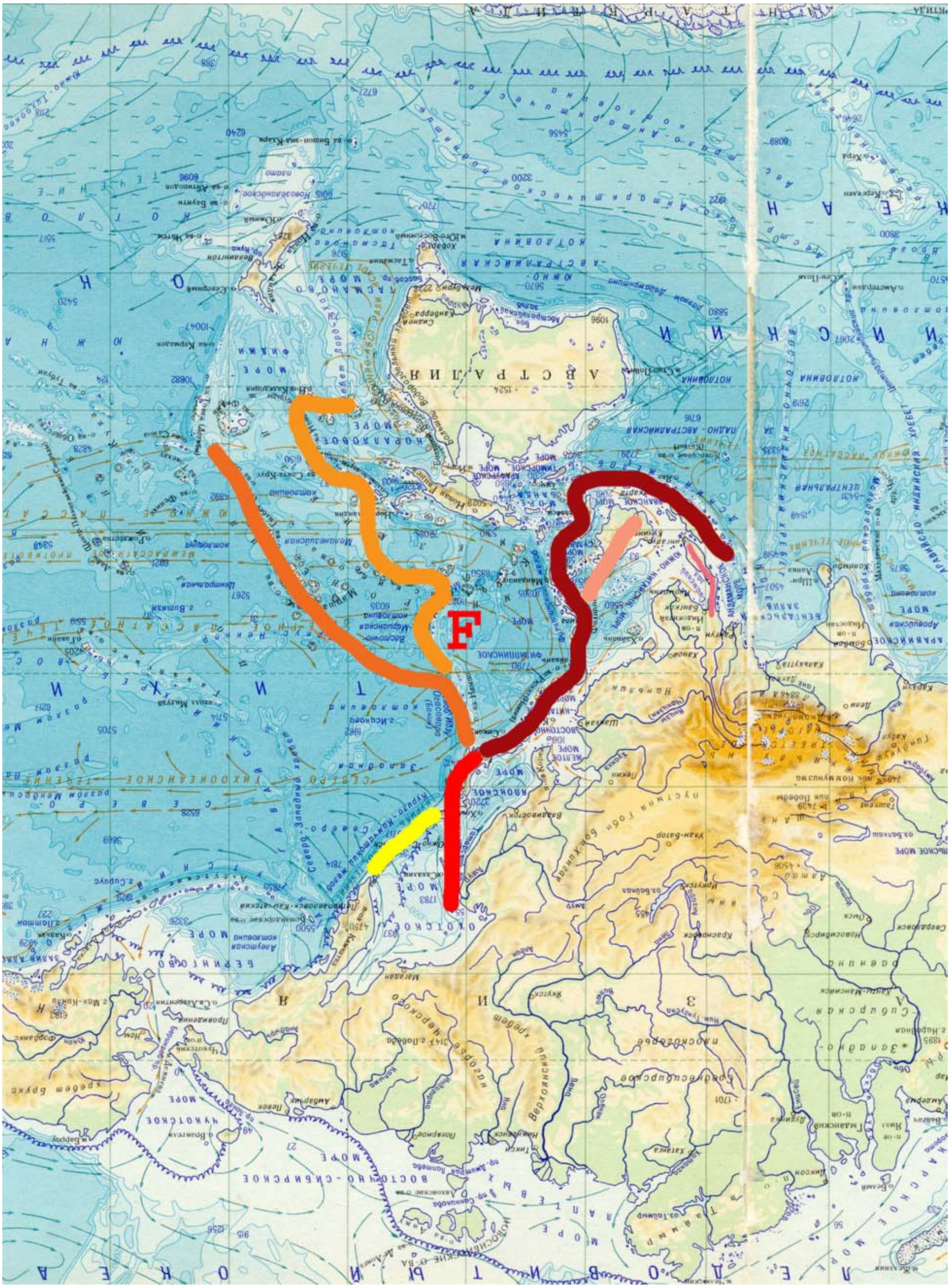

Fig. 3. The Mariana Mississippi (Fig. 2). A Caspian Sea of this Mississippi is Australia (convex up) (Fig. 2.3, [1:15, Fig. 6]). Malacca = Ontario (= a Black Sea). Red and dark-red curves are connected to Black Seas Kamchatka and Malacca by the same manner. A yellow-orange curve is connected to a Caspian Sea = Australia. See Fig. 1 upper: the yellow-orange curve is connected to the region of the Malay Peninsula (a Black Sea), i.e. Indochina is a Caspian Sea (therefore Chukotka is a Caspian Sea too; see [1:5, Fig. 4]).

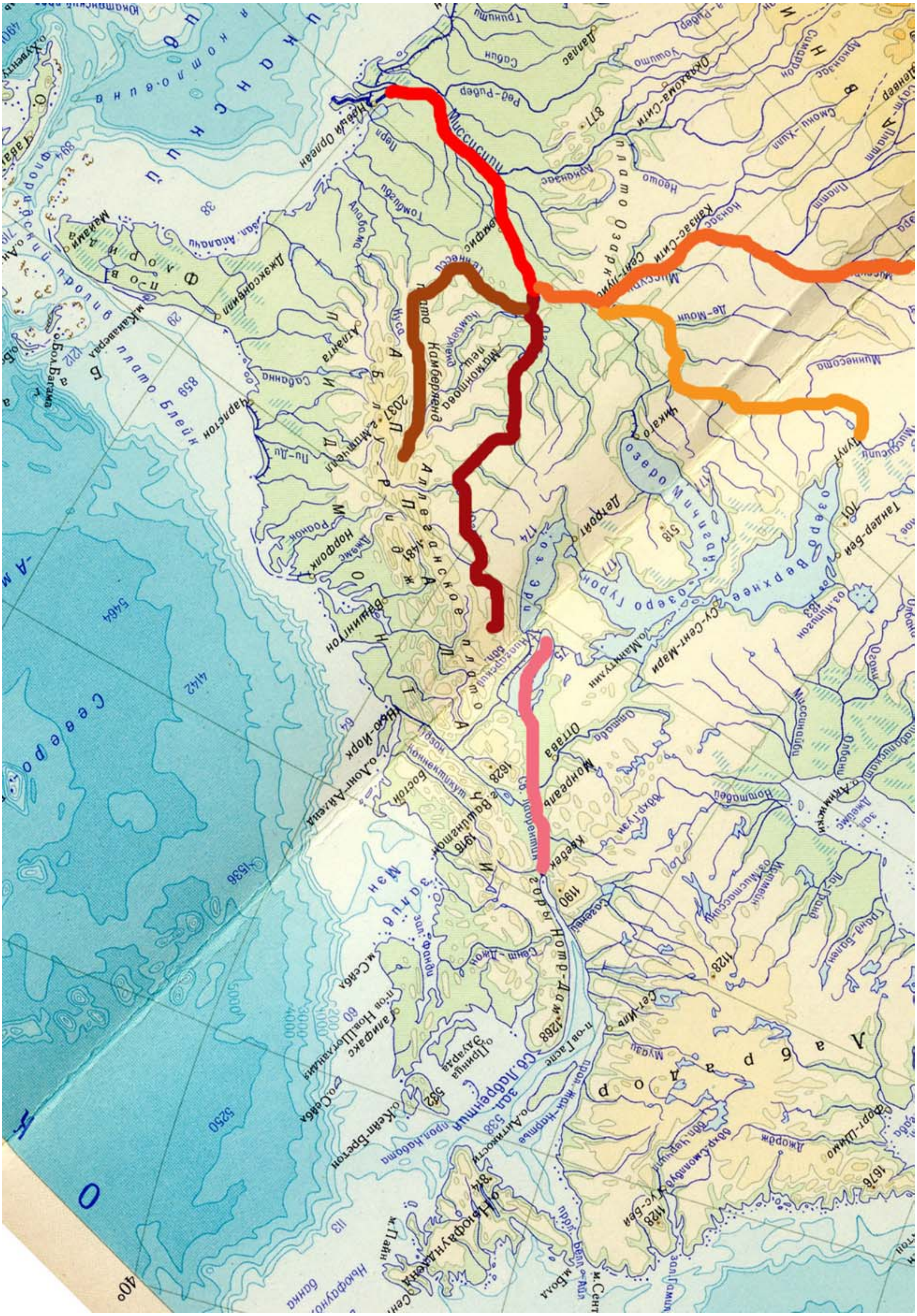

Fig. 4. The Mississippi from the point of view of comparing Lake Ontario with the Black Sea (Fig. 2.1, 2.5 right).

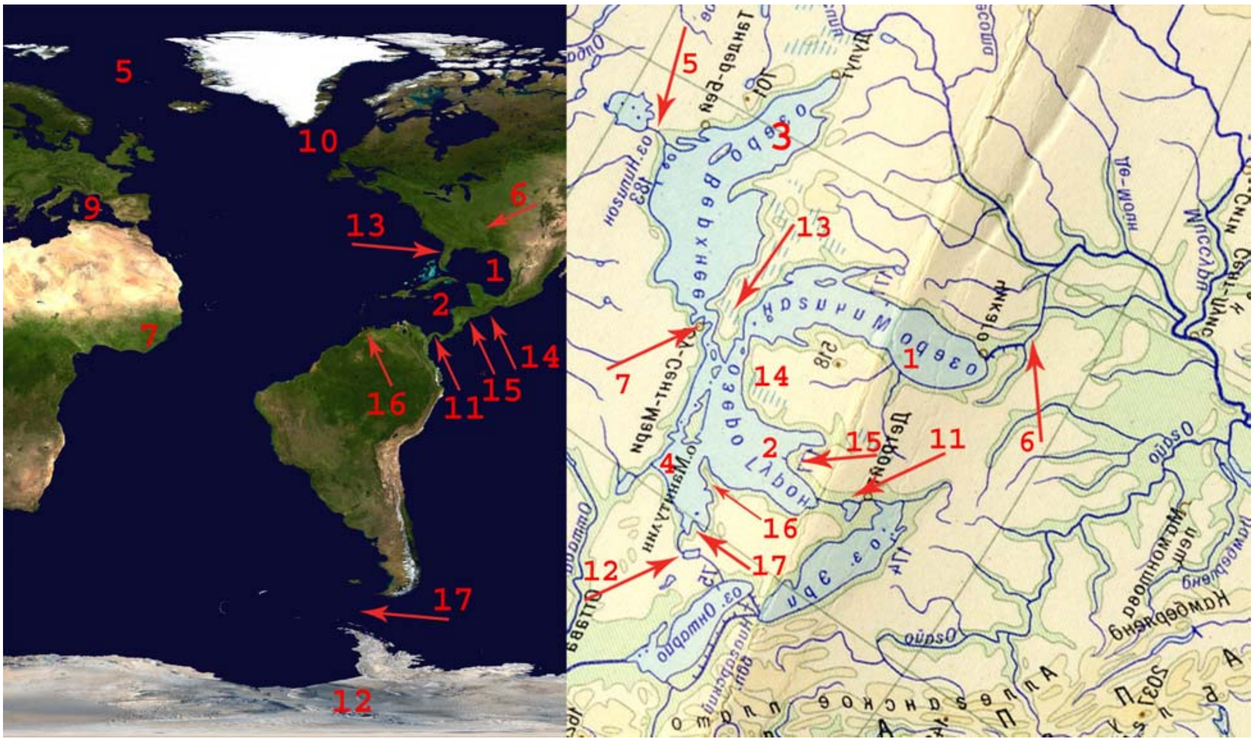

Fig. 5. Left: The Atlantic (mirrored) is a Caspian Sea and an Antarctida (Fig. 2.13 lower, 1.4). Here the Mississippi (6) grows up “from head”. However a classical Mississippi “from buttocks” (12) exists too (Fig. 10-11). **Right:** Great Lakes (mirrored). The Mississippi “from head” doesn’t grow up just from the head. There are also two Mississippis “from buttocks” (11), (12), they grow up from left components of their binary complexes [2]. A Mississippi (11) (right) = the Panama Canal (left). The lake (11) (right) = Lake Gatun as part of the Panama Canal (left). Lake Erie (right) = the Pacific (left). The lake (12) (right) is a Lake Gatun too [1:1, Fig. 7, 8].

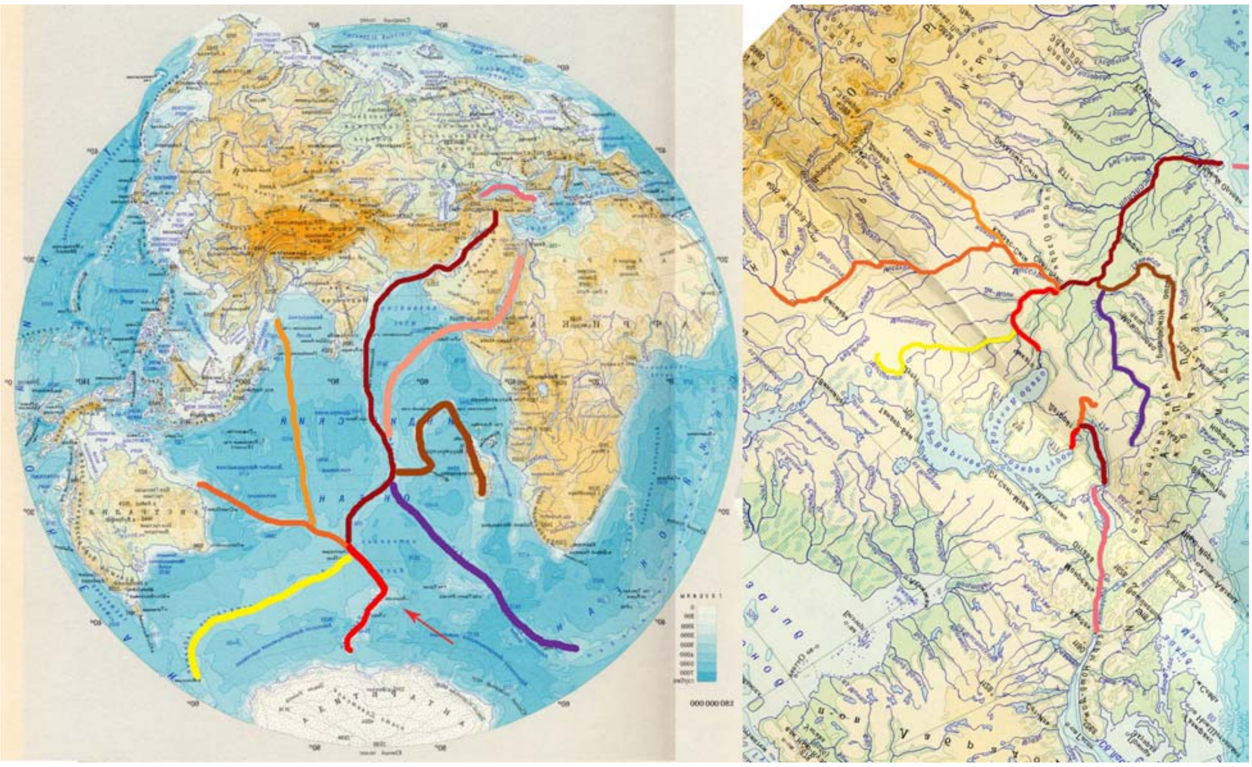

Fig. 6. Left: A Mississippi in the Indian Ocean (mirrored), with a Lake Gatun (arrow). See Fig. 5. **Right:** Two Mississippis (mirrored) grow up from Great Lakes, “from head” and “from buttocks”. See Fig. 5. The Gulf of Mexico = a Black Sea with respect to the Atlantic = a Mediterranean Sea, see Fig. 5 left. Lake Ontario is a Black Sea (Fig. 2.6). At the left and at the right dark-red curves are connected to Black Seas, yellow-orange curves are connected to the most high local mountains. See Fig. 1 lower: the yellow-orange curve is connected to Great Lakes.

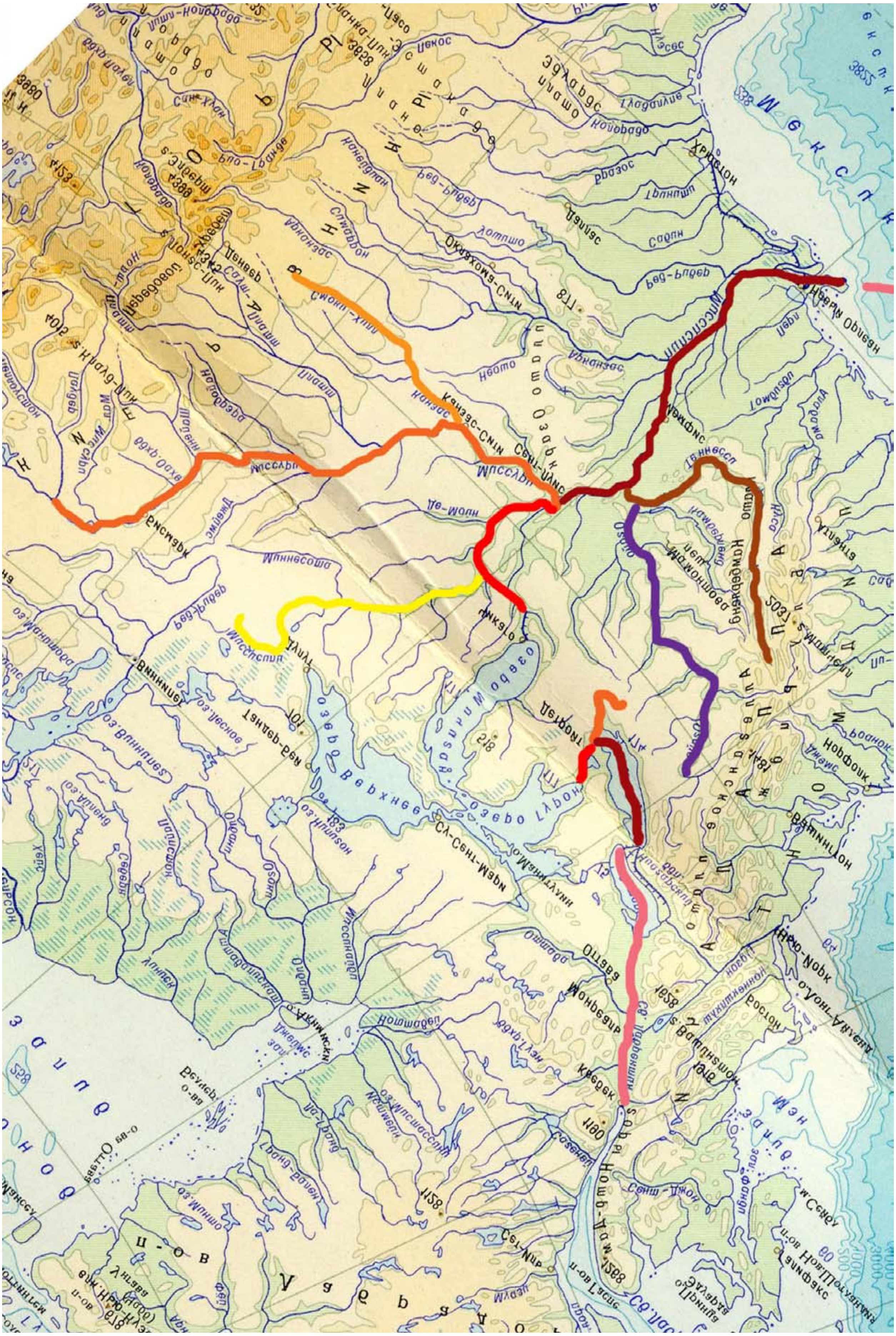

Fig. 7. Enlarged Fig. 6 right. Two Mississippis (mirrored) grow up from Great Lakes. The Mississippi "from head" has it's own Panama Isthmus with a canal.

Fig. 8. The Mississippi “from head” of the Gulf of Saint Lawrence = a Mediterranean Sea grows up (through the isthmus) from Lake Ontario = a Black Sea (Fig. 2.5-2.6). The same Mississippi can be considered as growing up from three different roots (Fig. 4, 7, 8), “from head” in all the three cases. Thus the Mississippi has three authomorphisms and a corresponding Galois extension theory [3].

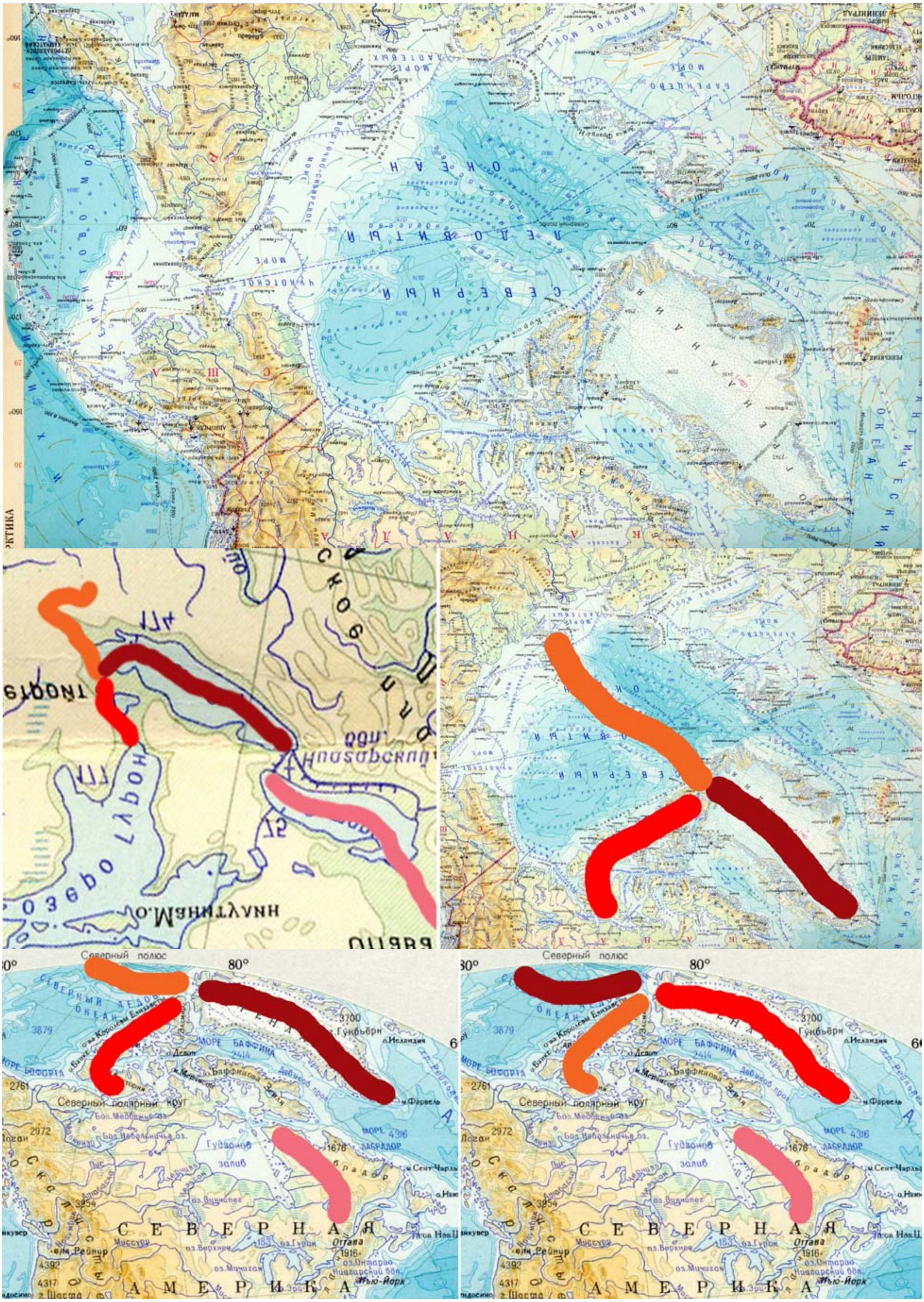

Fig. 9. Consider America as an Antarctida (Fig. 1.2). We see a Mississippi "from buttocks". The dark-red curve is connected to a Black Sea = the Labrador Peninsula. See Fig. 3-4 (Lake Ontario = the Malay Peninsula); Fig. 5.2 (Kamchatka = Labrador). **Center, left:** A fragment of Fig. 7. **Lower, right:** The Mississippi "from head" is a result of an authomorphism. It is analogous to the authomorphism of Fig. 4, 8.

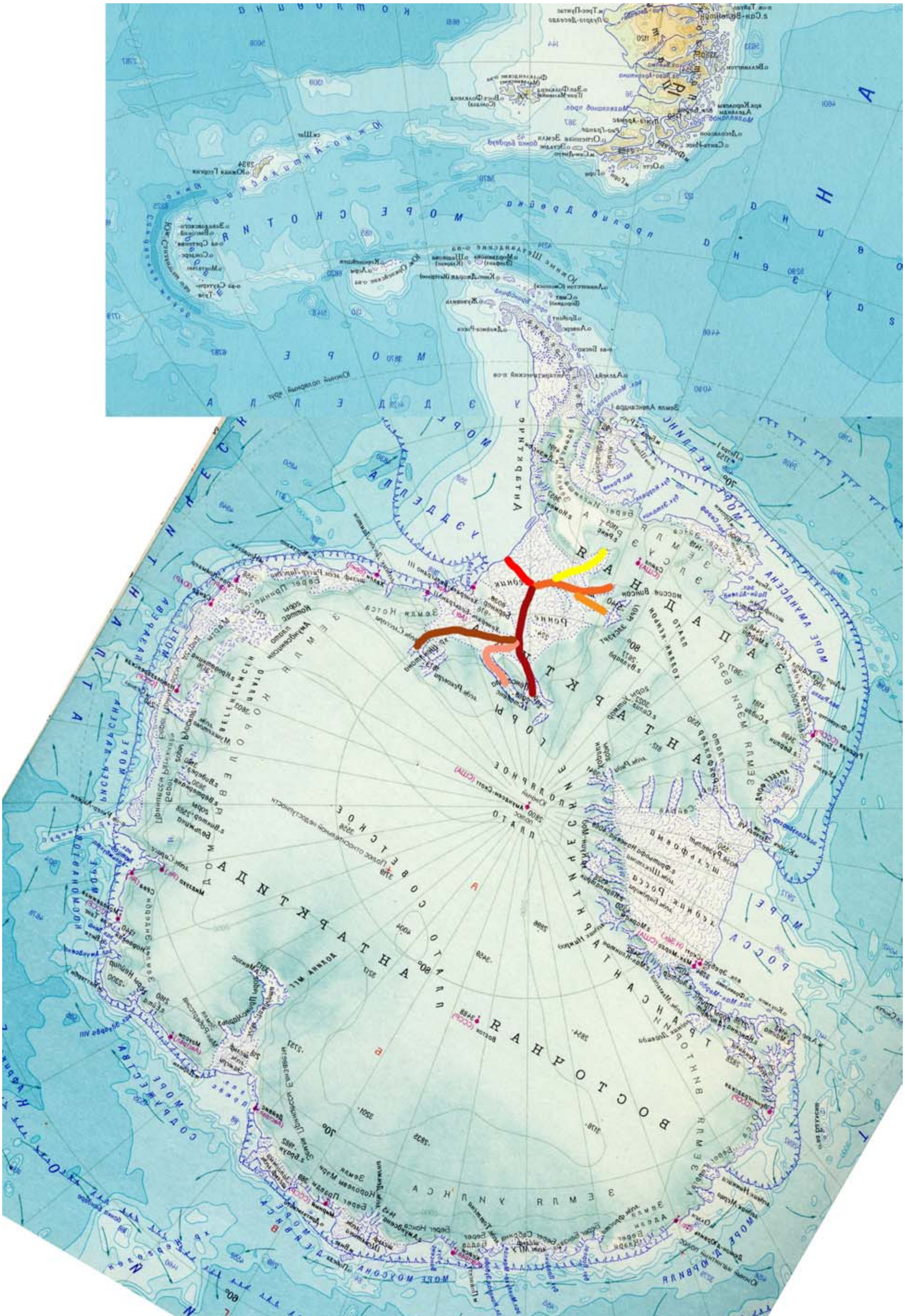

Fig. 10. The Atlantic Mississippi (12) “from buttocks” in Antarctida (mirrored). See Fig. 5 left, 6 right. The yellow-orange curve is connected to Mount Vinson, the highest point of Antarctida (see Fig. 6).

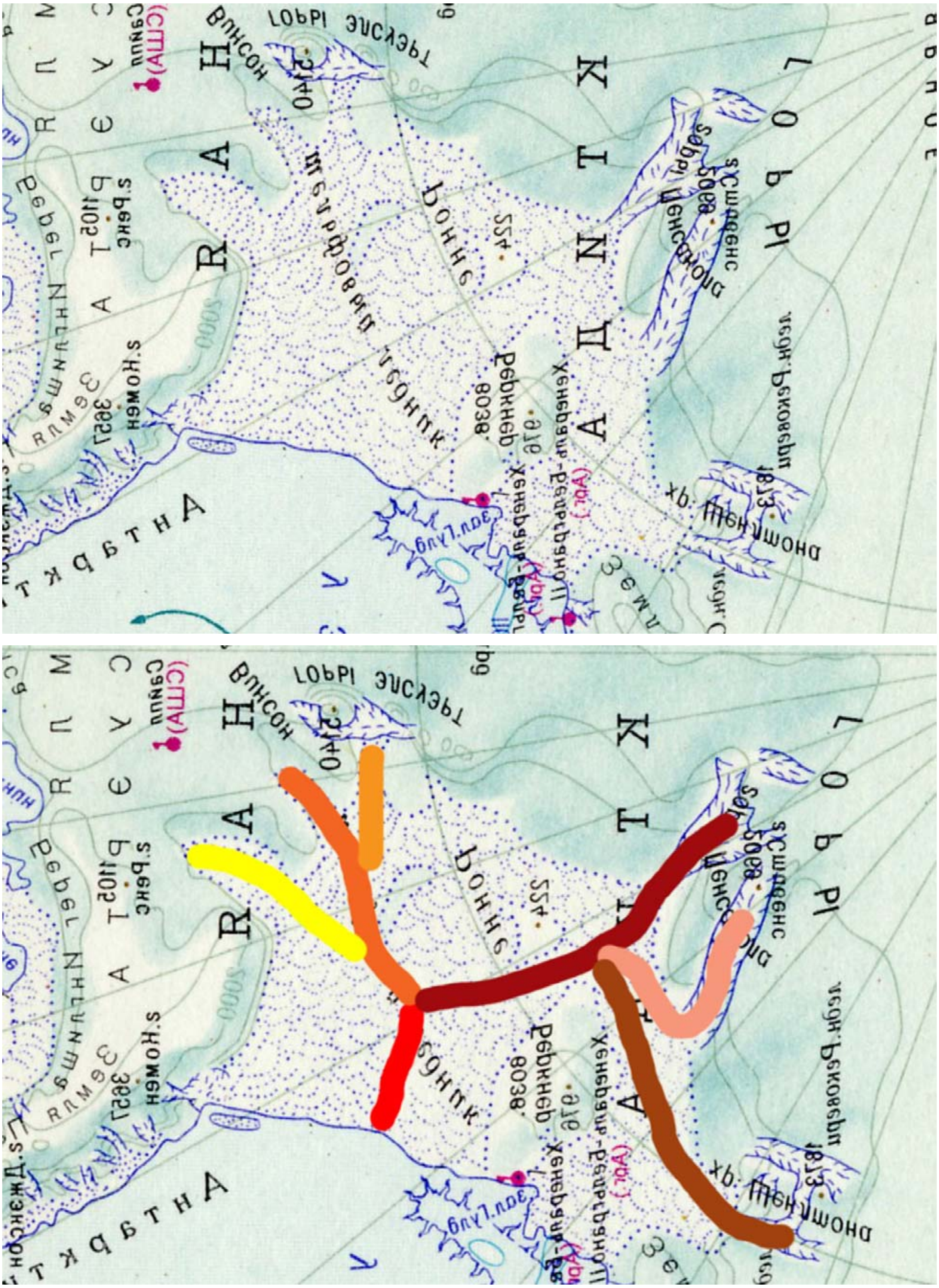

Fig. 11. The Atlantic Mississippi (12) "from buttocks" (mirrored), a fragment of Fig. 10. See Fig. 5 left. The yellow-orange curve is connected to Mount Vinson, the highest point of Antarctida (see Fig. 6).

4. Himalayan Mississippis

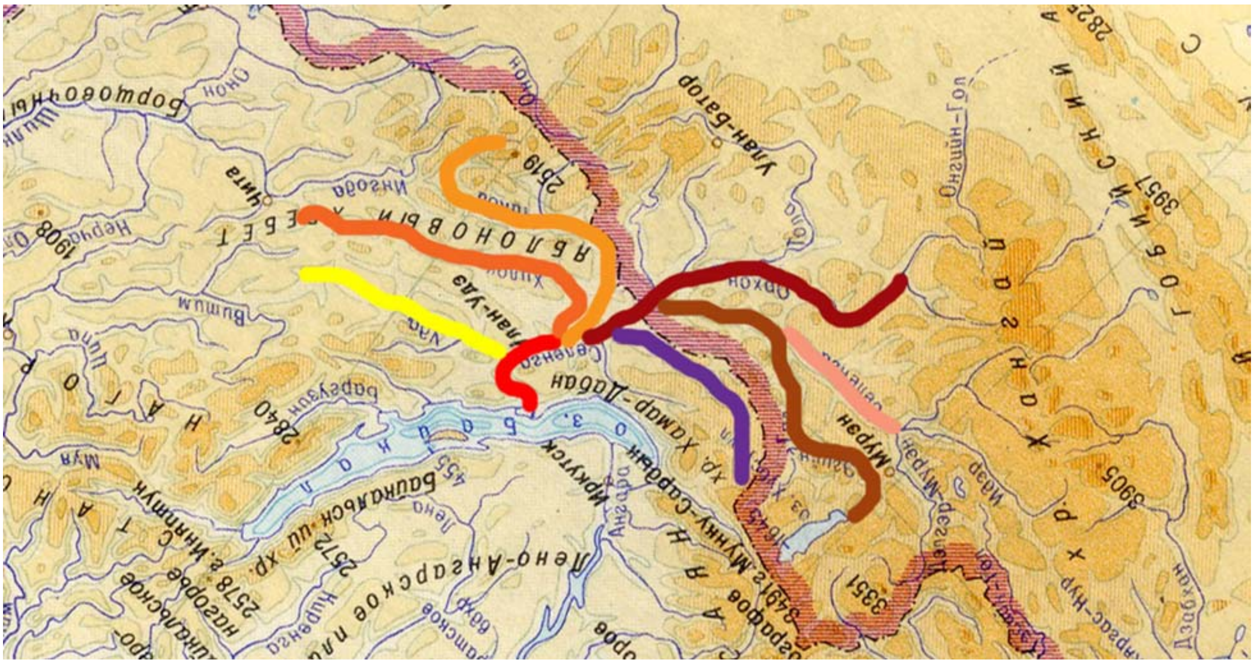

Fig. 1. The Baikal Mississippi (12) “from buttocks”. See Fig. 3.5, 2.4.

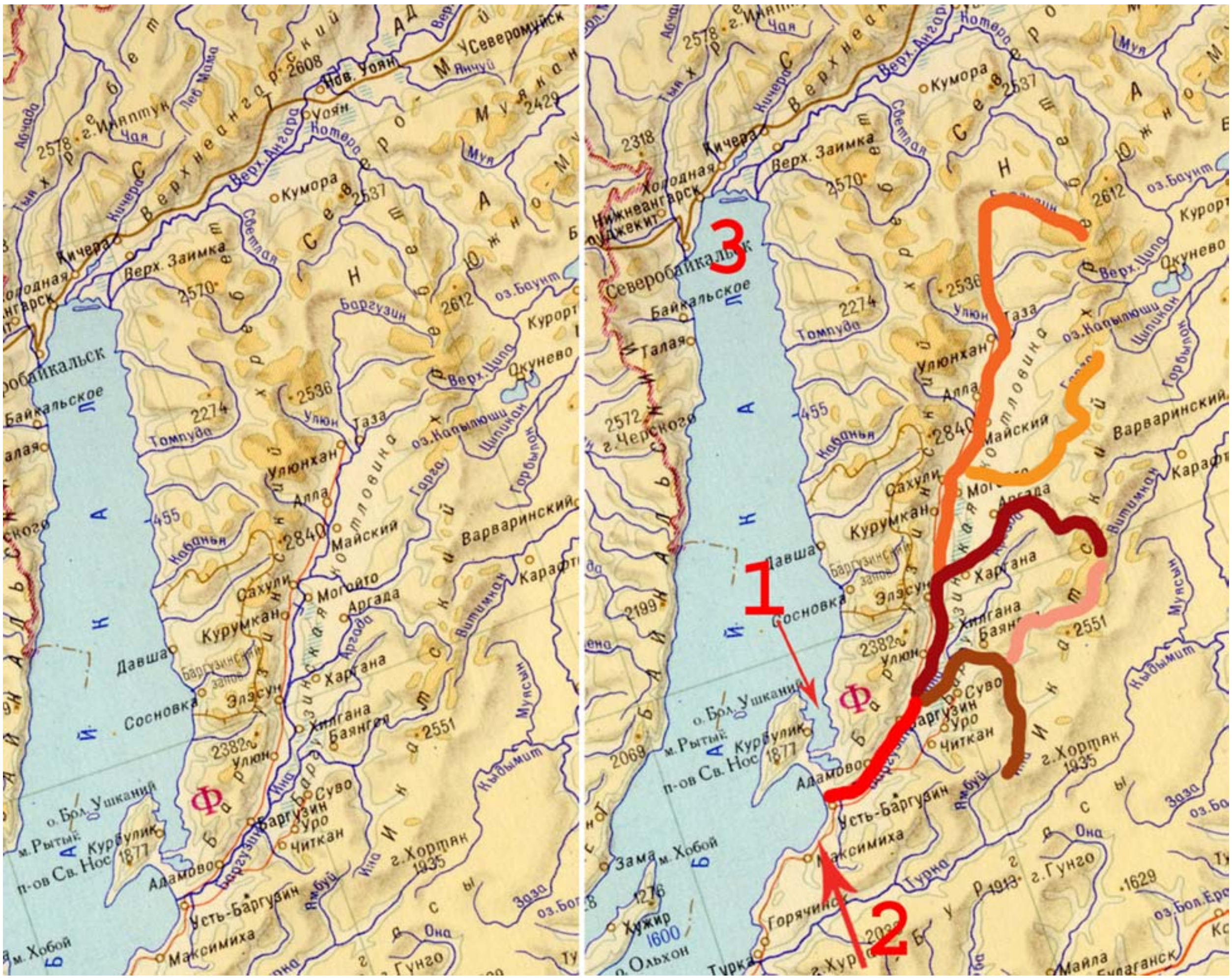

Fig. 2. The Baikal Mississippi (11) (we use here notations from Fig. 3.5).

Fig. 3. Lake Baikal in Asia. See [1:15, Fig. 2, 6]: Easter Island's region in the Pacific Ocean is corresponded to Lake Baikal. There is it's own Mississippi (Fig. 4). Antarctida is corresponded to the Himalayas.

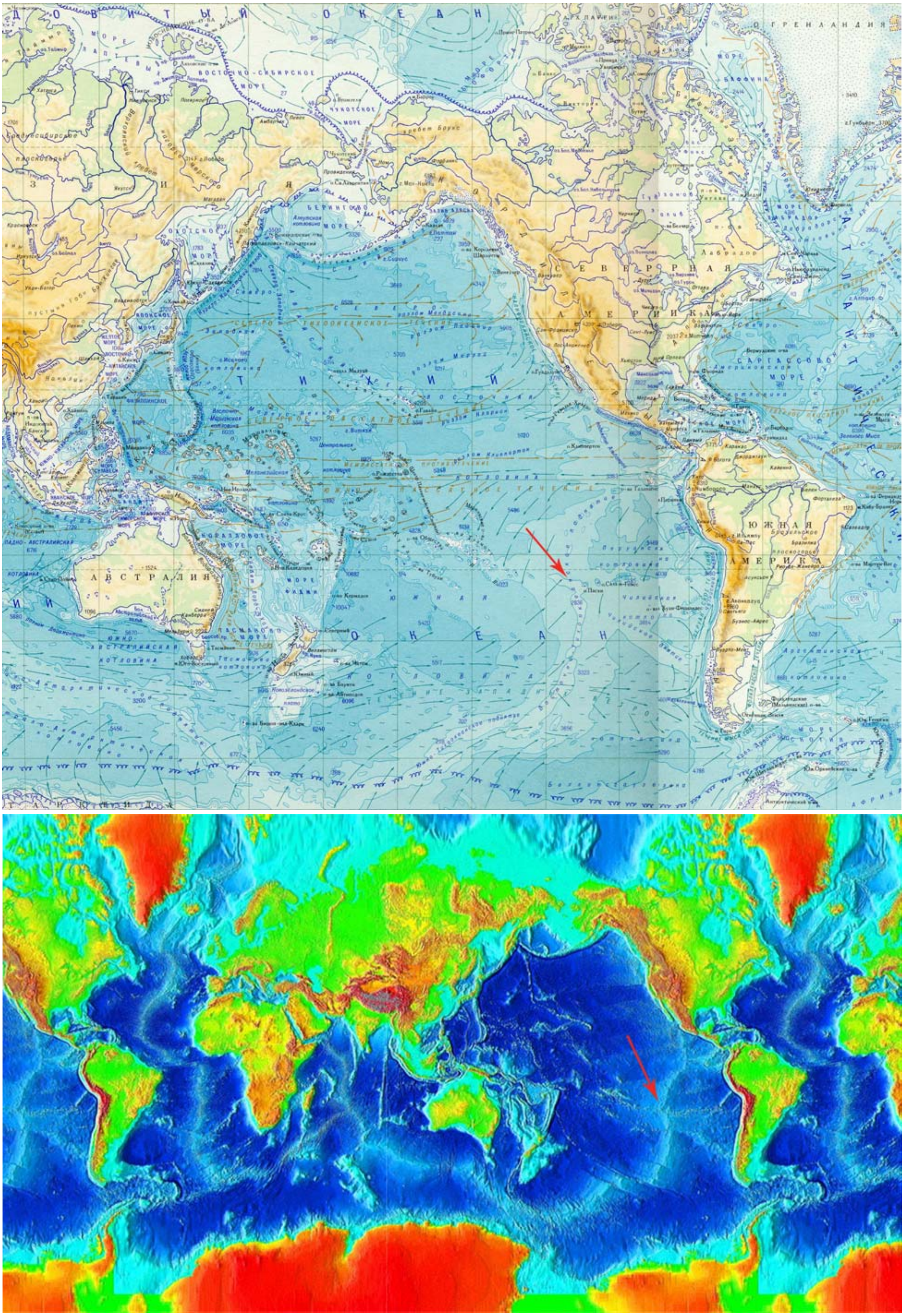

Fig. 4. The analog of the Baikal Mississippi in the Pacific. The analog of Lake Baikal is pointed by the arrow.

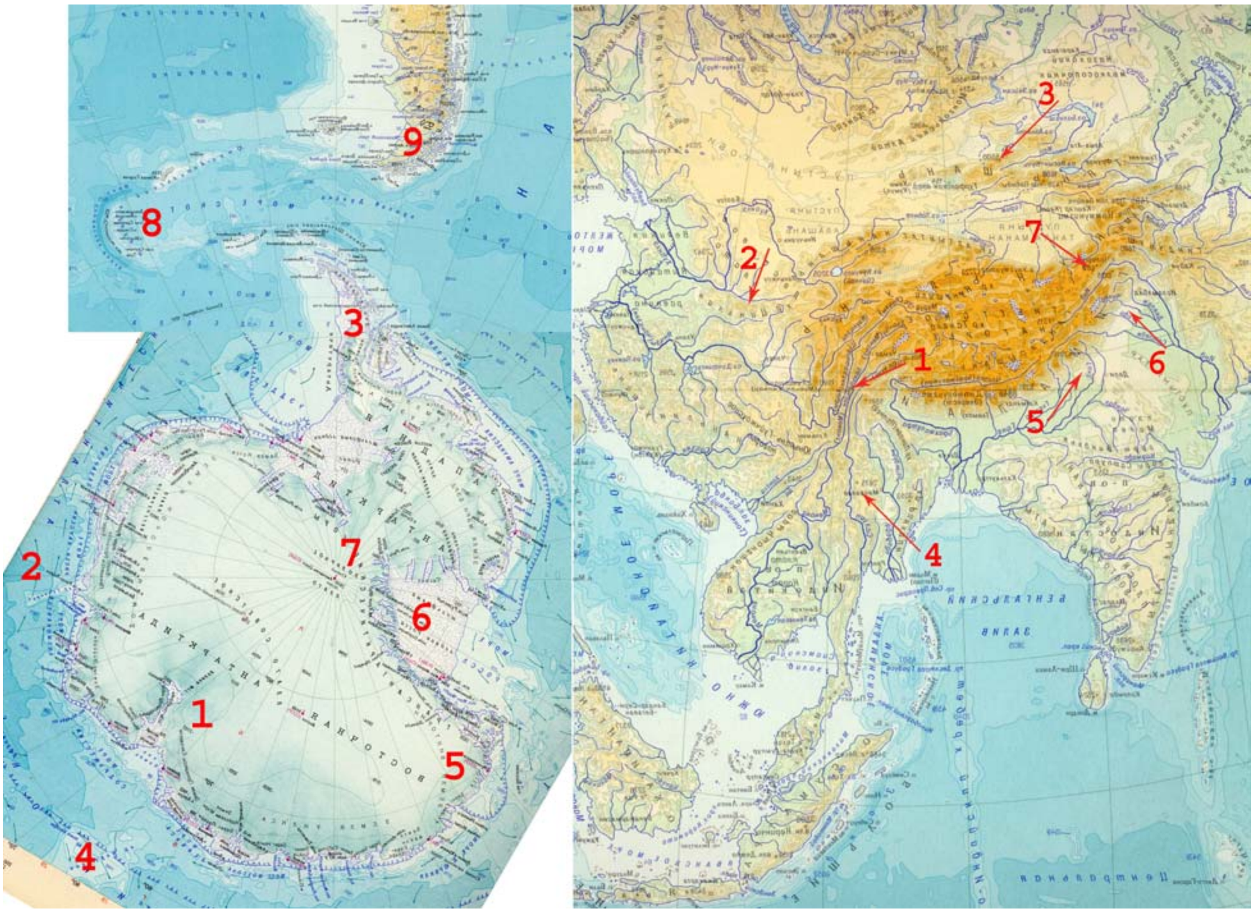

Fig. 5. The Himalayas are an Antarctida (both images are mirrored), see Fig. 3. Indochina is a Mississippi.

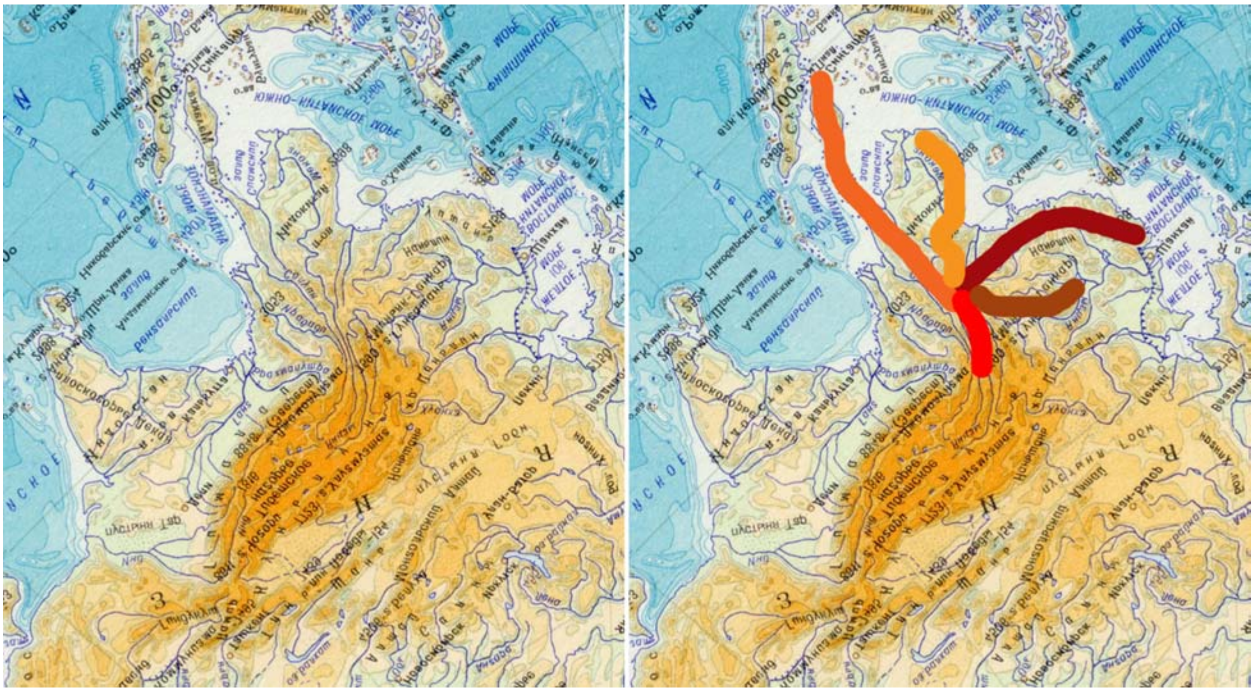

Fig. 6. The Himalayan Mississippi “from buttocks” (mirrored).

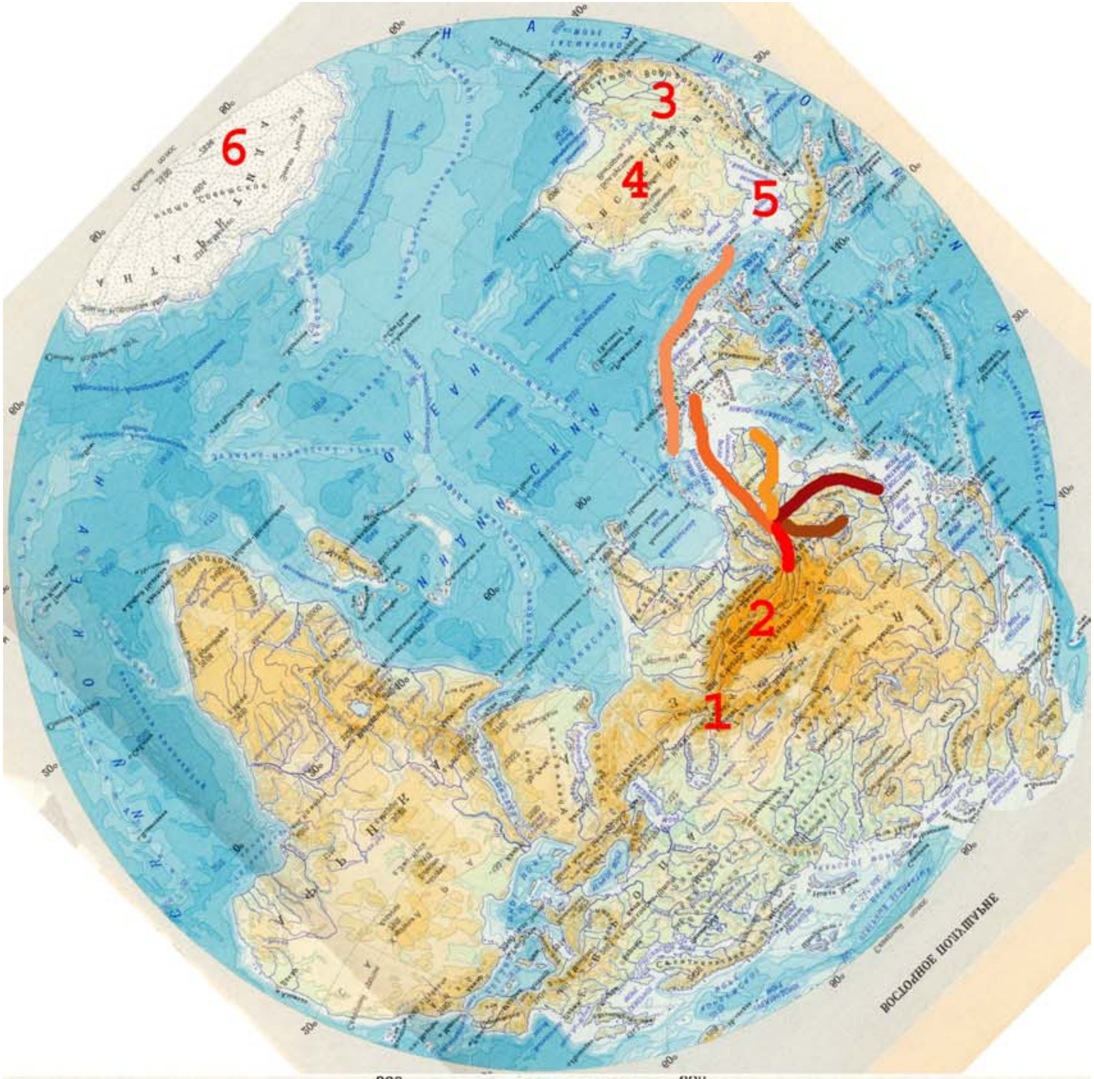

Fig. 7. The Arctic Ocean = Antarctida [1:10, Fig. 8, 10].

Fig. 8. By Fig. 7 the Philippines + Sulawesi + Kalimantan (Borneo) are a convex up Caspian Sea (or Great Lakes). The Mariana Mississippi is located at the position of the Gulf of Saint Lawrence, and Indochina is located at the position of the Mississippi. See Fig. 3.3.

Fig. 9. Sulawesi itself is a convex up Caspian Sea (Fig. 2.10). Comparing neighborhoods of Sulawesi and Great Lakes. Here Malacca = Ontario, Kalimantan = Hudson Bay, the arc of the islands Sumatra + Java + Tymor + Seram = Ery Lake.

5. Chukotkian Mississippis

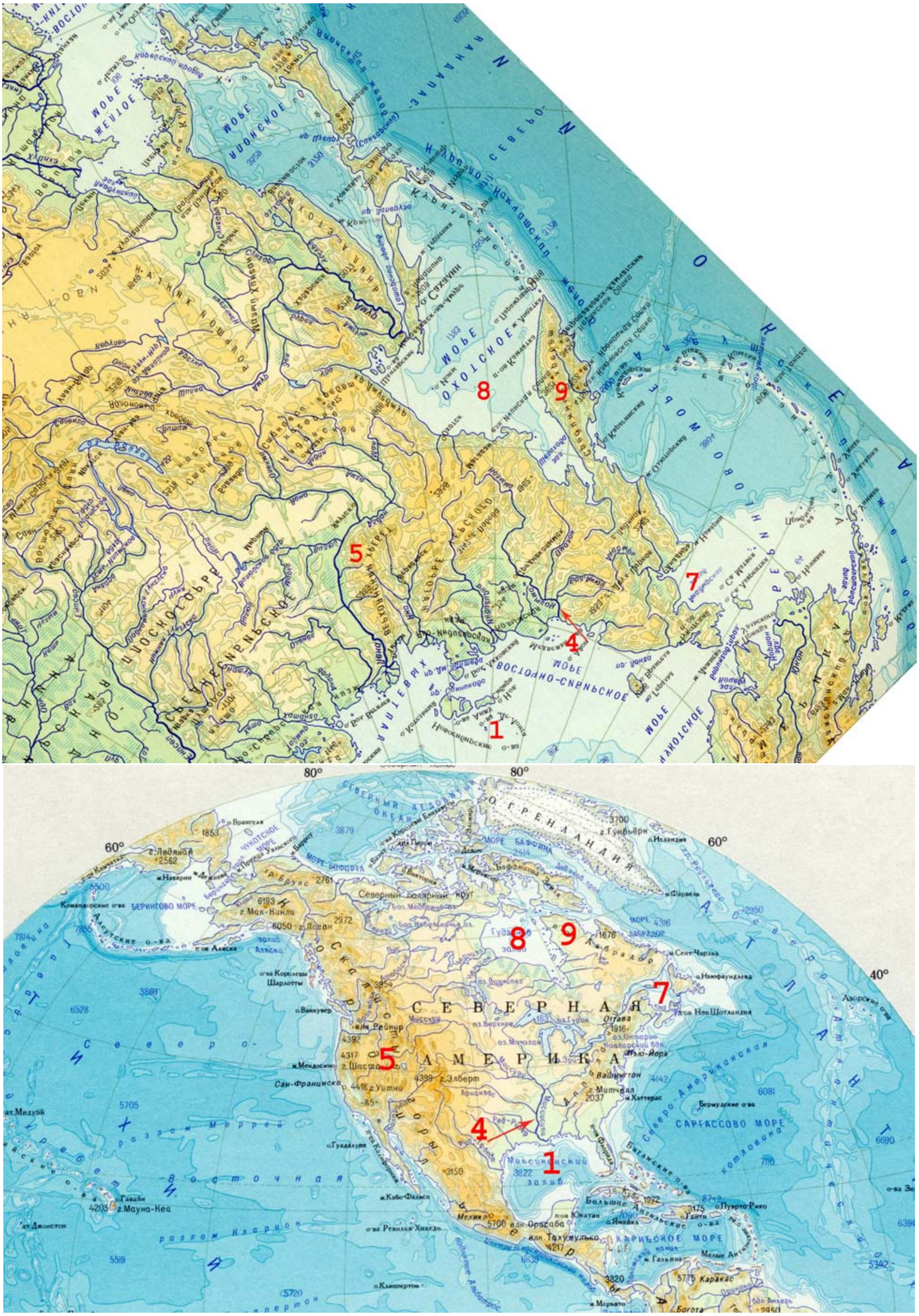

Fig. 1. The Kolyma Mississippi (mirrored) grows up from Arctic Antarctida. We use here notifications from [1:10, Fig. 10].

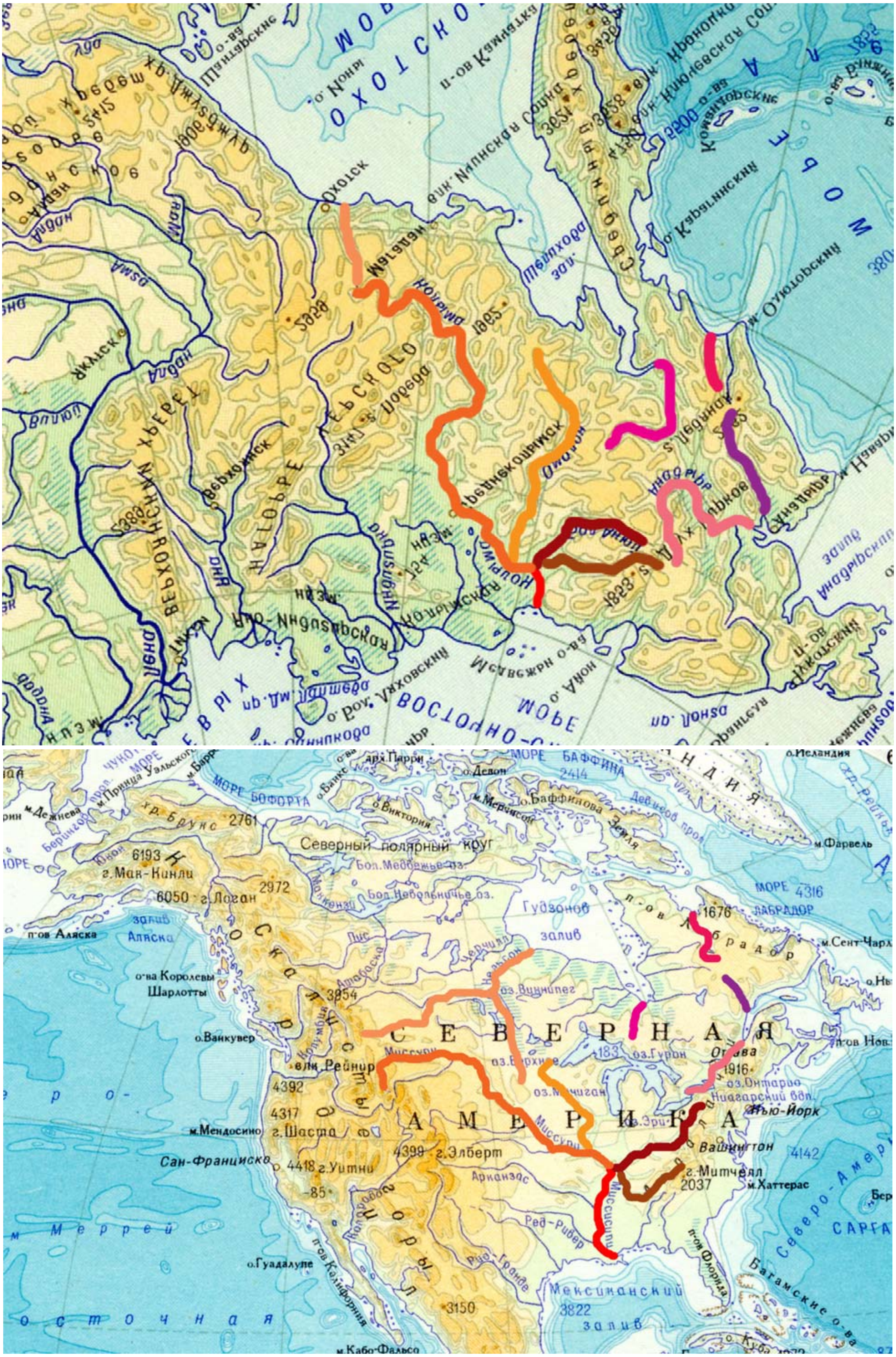

Рис. 2. In Chukotka it's Caspian Sea is convex up, i.e. it is a height. See Section 2.

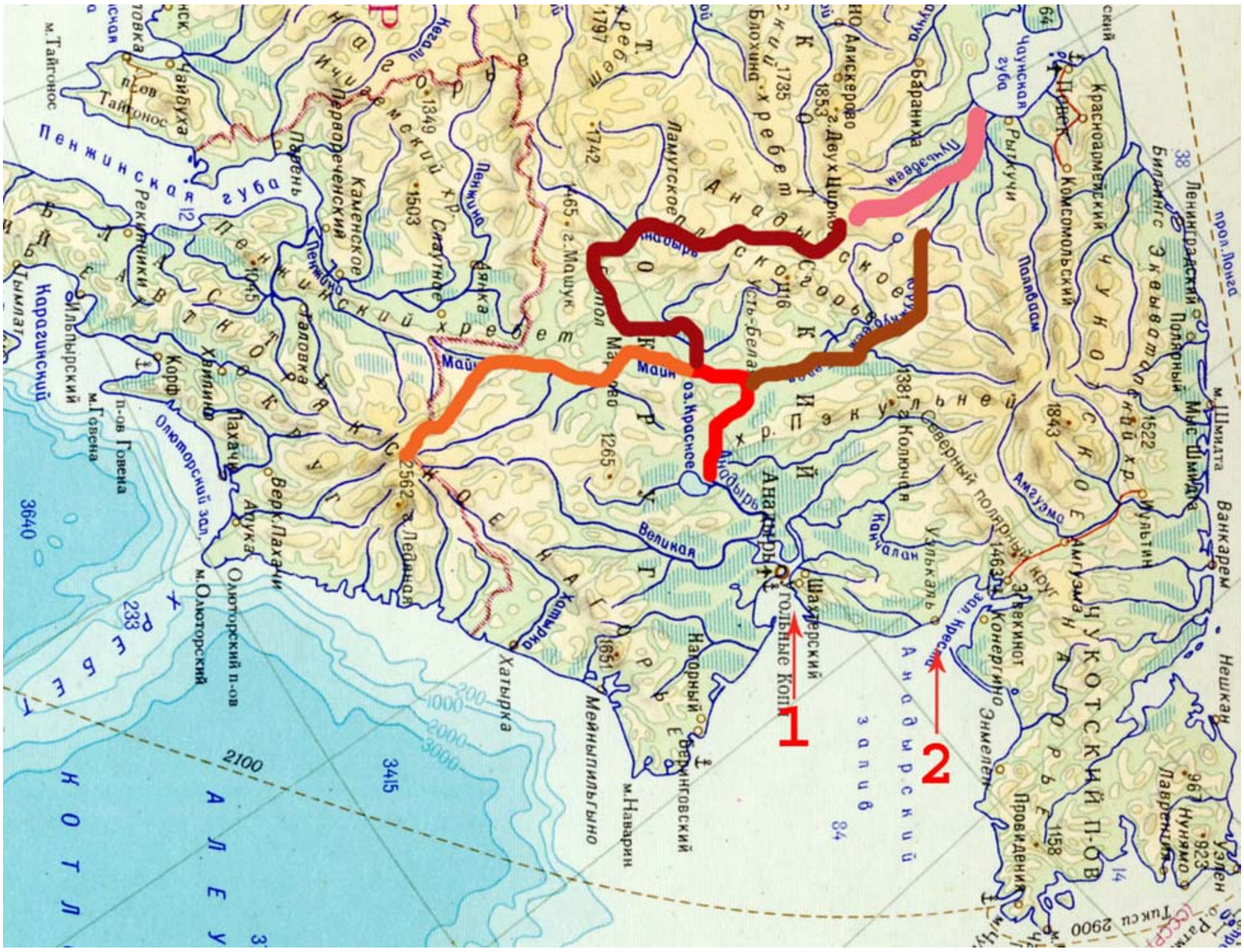

Fig. 3. The Anadyr Mississippi “from head” (Fig. 2.8).

Рис. 4. Two Mississippis around the same convex up Caspian Sea. This Caspian Sea is prolongating the Chaun Bay and the Chaun River (the pastel magenta curve).

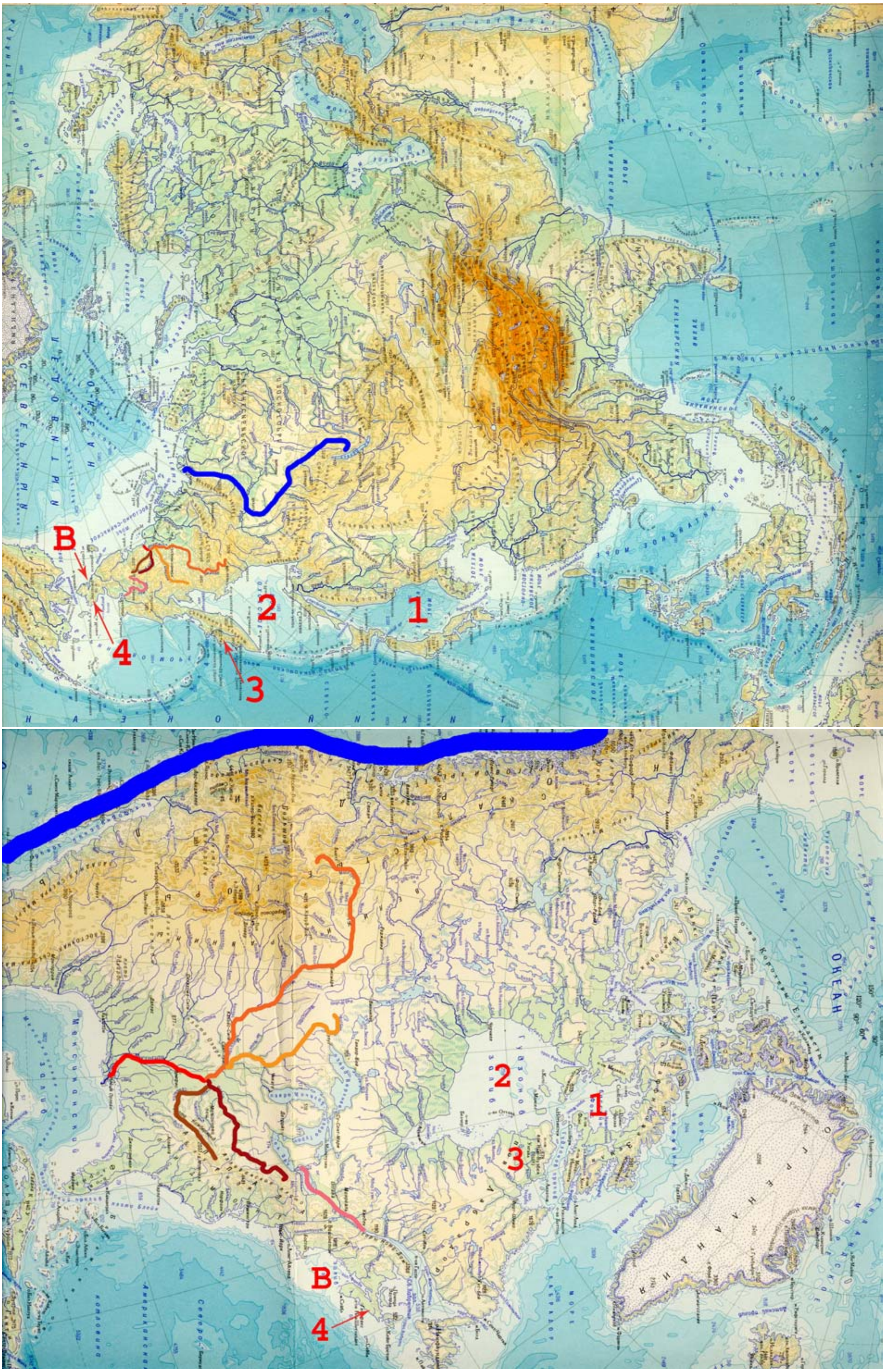

Fig. 5. Chukotka in Asia. Comparing with North America.

Fig. 6. Japan-Okhotsk Antarctida (mirrored) and Hudson Antarctida. See Fig. 1, 2. Locations of Caspian Seas (3) are the same.

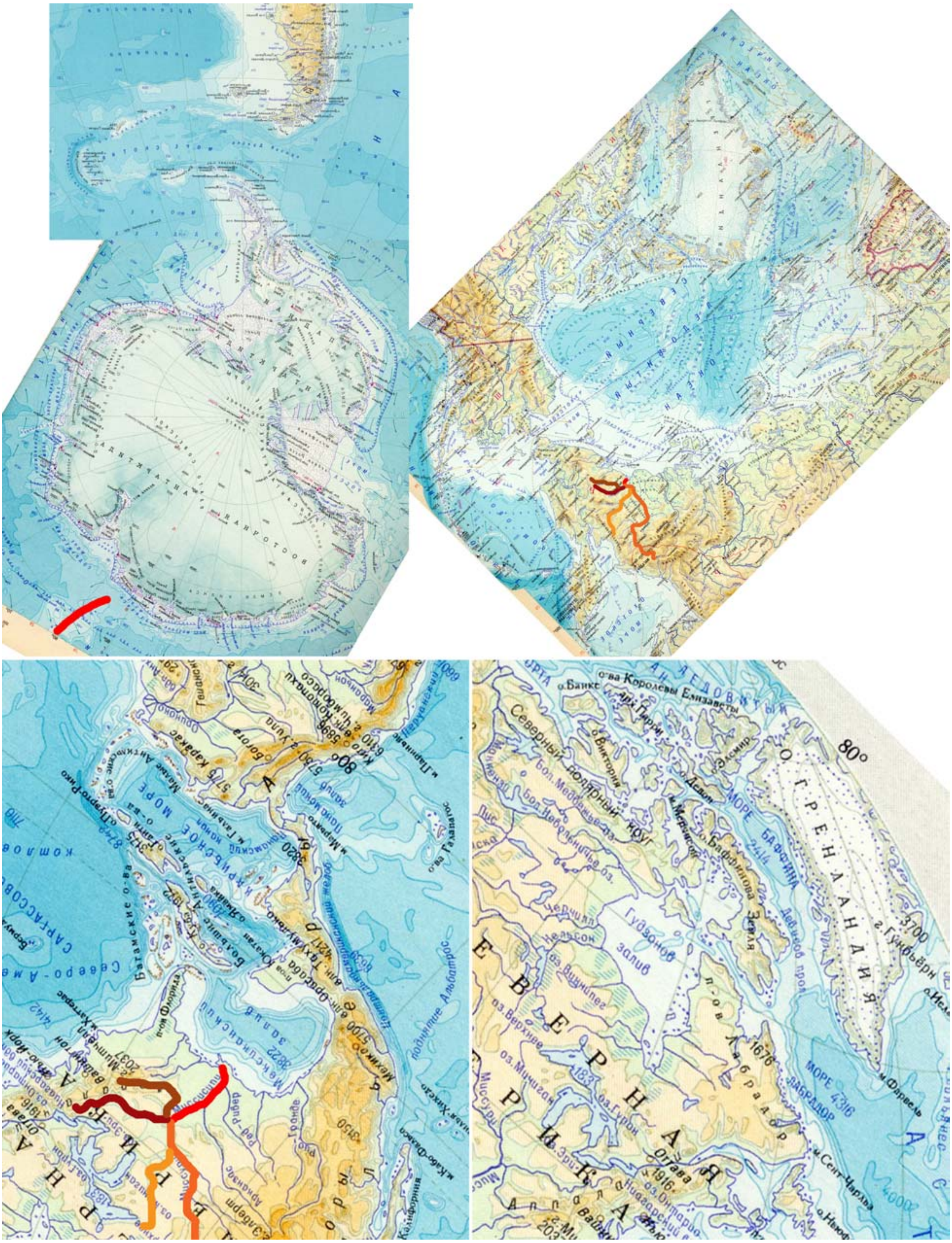

Fig. 7. Different Antarctidas are reduced to the same orientation. Their own classical Mississippis are located lower left. **Upper left:** Classical Antarctida (mirrored). **Upper right:** Arctic Antarctida (mirrored). **Lower left:** Caribbean Antarctida. **Lower right:** Hudson Antarctida. There are Great Lakes at the position of classical Mississippi.

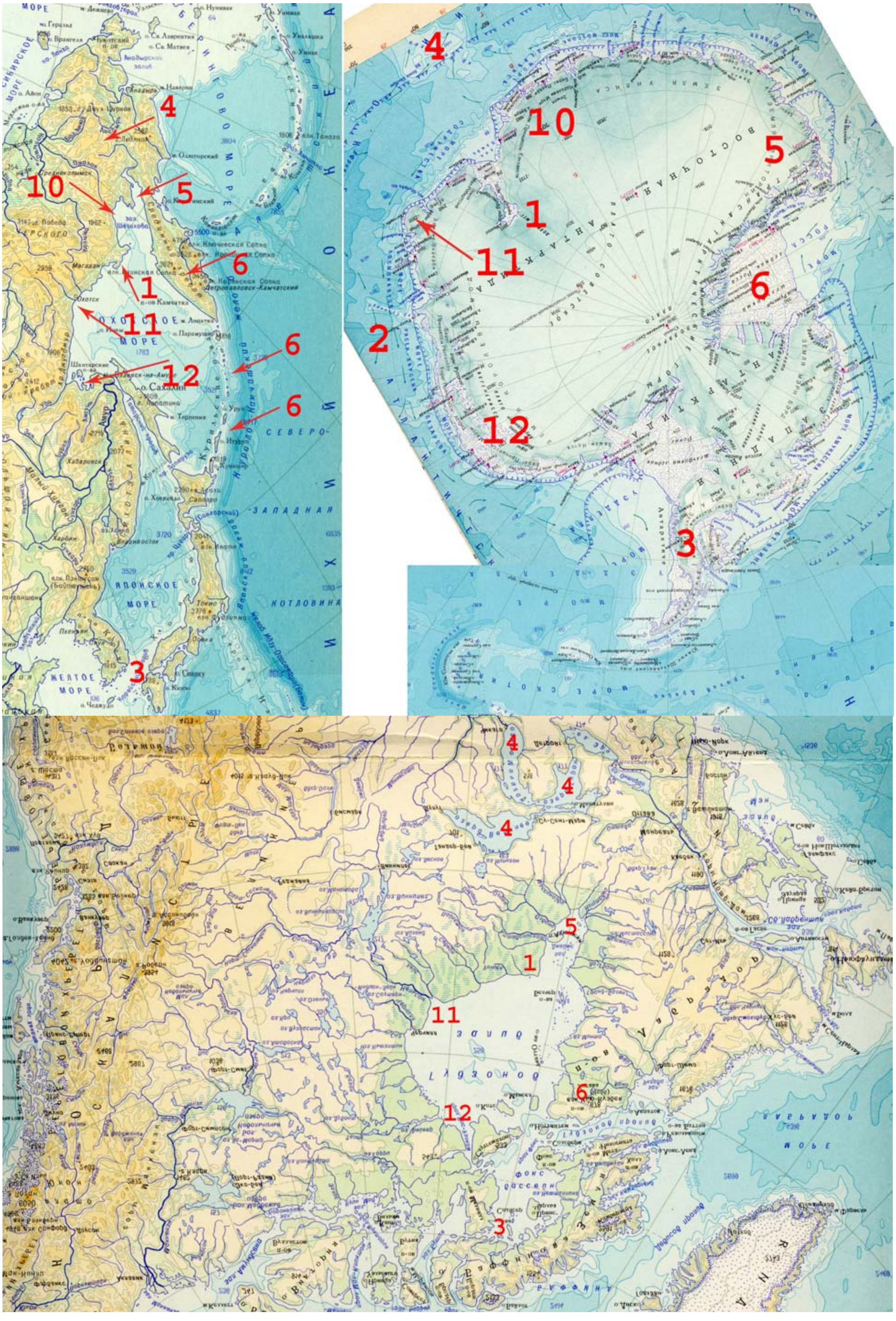

Fig. 8. Detailed analysis of Japan-Okhotsk Antarctida (and corresponding Hudson Antarctida). The element (4) (upper left) (at Fig. 2 it was identified as a Caspian Sea) is placed at Mississippi's position.

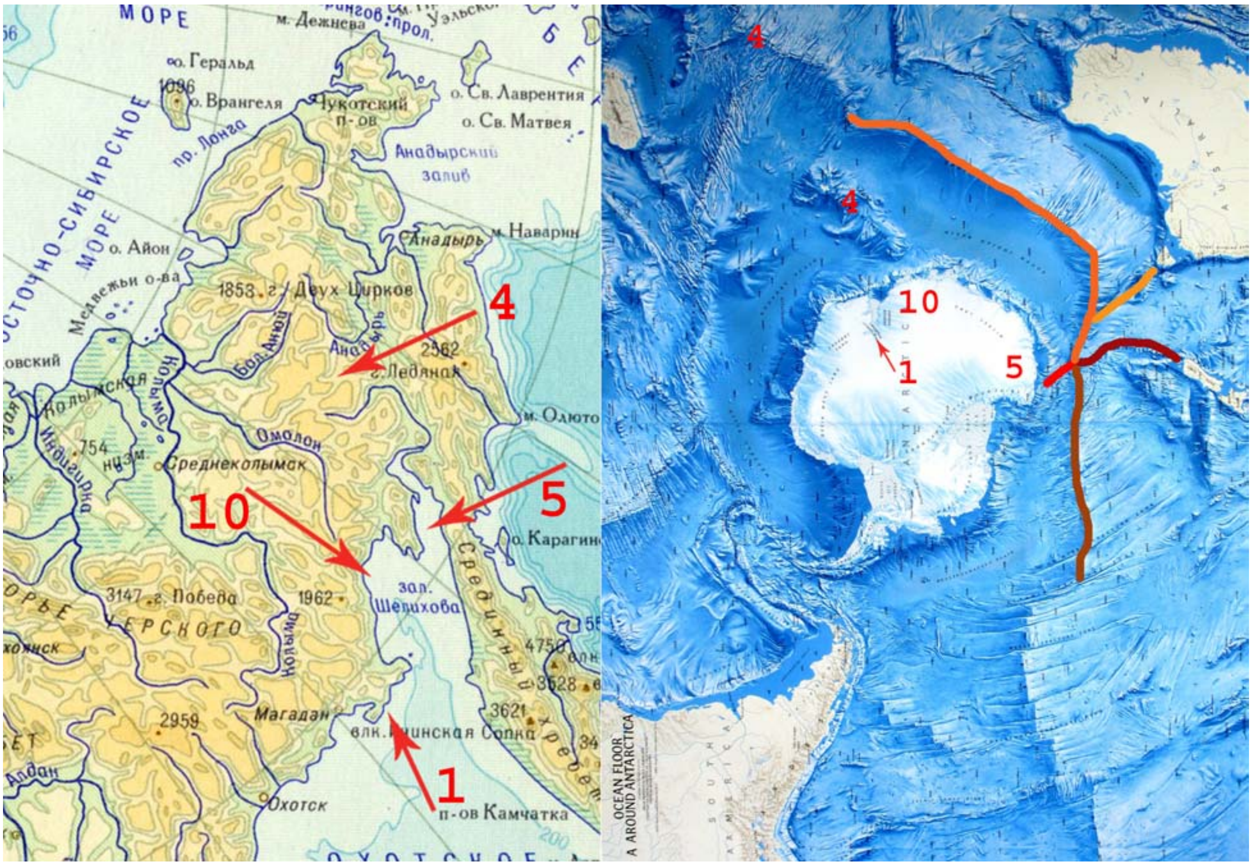

Fig. 9. There is a Mississippi growing up from the ledge (5). It connects (5) and (4) (Fig. 3.5). Australia is a Caspian Sea with respect to this Mississippi (and with respect to the Mariana Mississippi, Fig. 3.3). Thus the obtained structure is analogous to Fig. 4.

Fig. 10. The Penzhin Mississippi grows up from the element (5) of Japan-Okhotsk Antarctida (Fig. 9). With respect to this Mississippi the Koryak Mountains are a convex up Caspian Sea. It is analogous to Australia (Fig. 9).

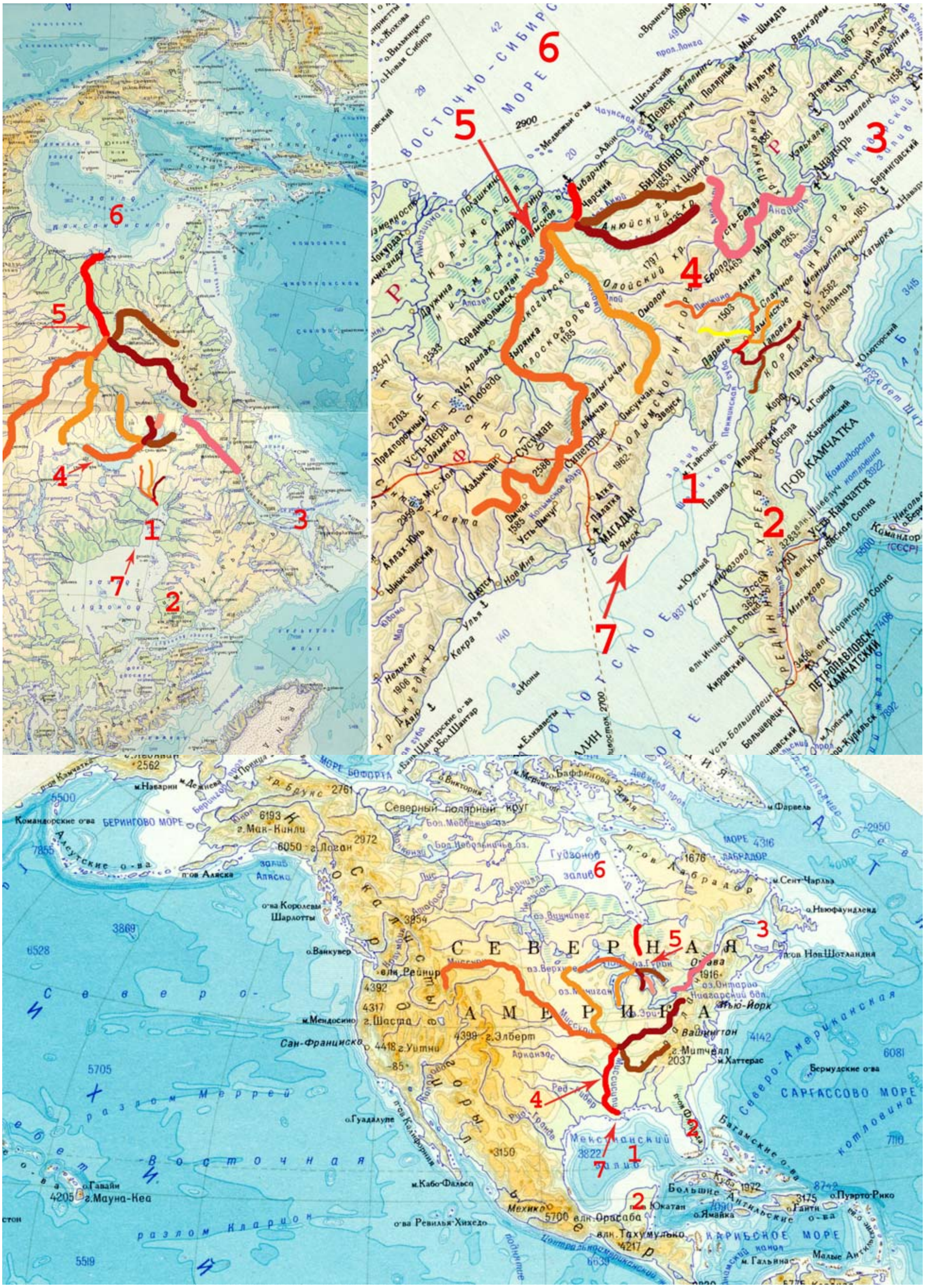

Fig. 11. Upper right: The element (4) in Chukotka is a convex up flow. It's size is unclear. At the lower picture (4) is bigger than (5). At the upper picture it is lesser. **Lower:** Caribbean Antarctida's bay (1) (at upper picture) (the ledge (5) at Fig. 9) is the whole Gulf of Mexico. This is a compensation of the contrary ("improper") orientation of Caribbean Antarctida. By such orientation, the bay (1) must be at the American Cordillera region, not at the Florida region, because for such orientation the element (2) is the Yucatán Peninsula, not Florida (so both Florida and Yucatán are being).

6. Siberian Mississippis

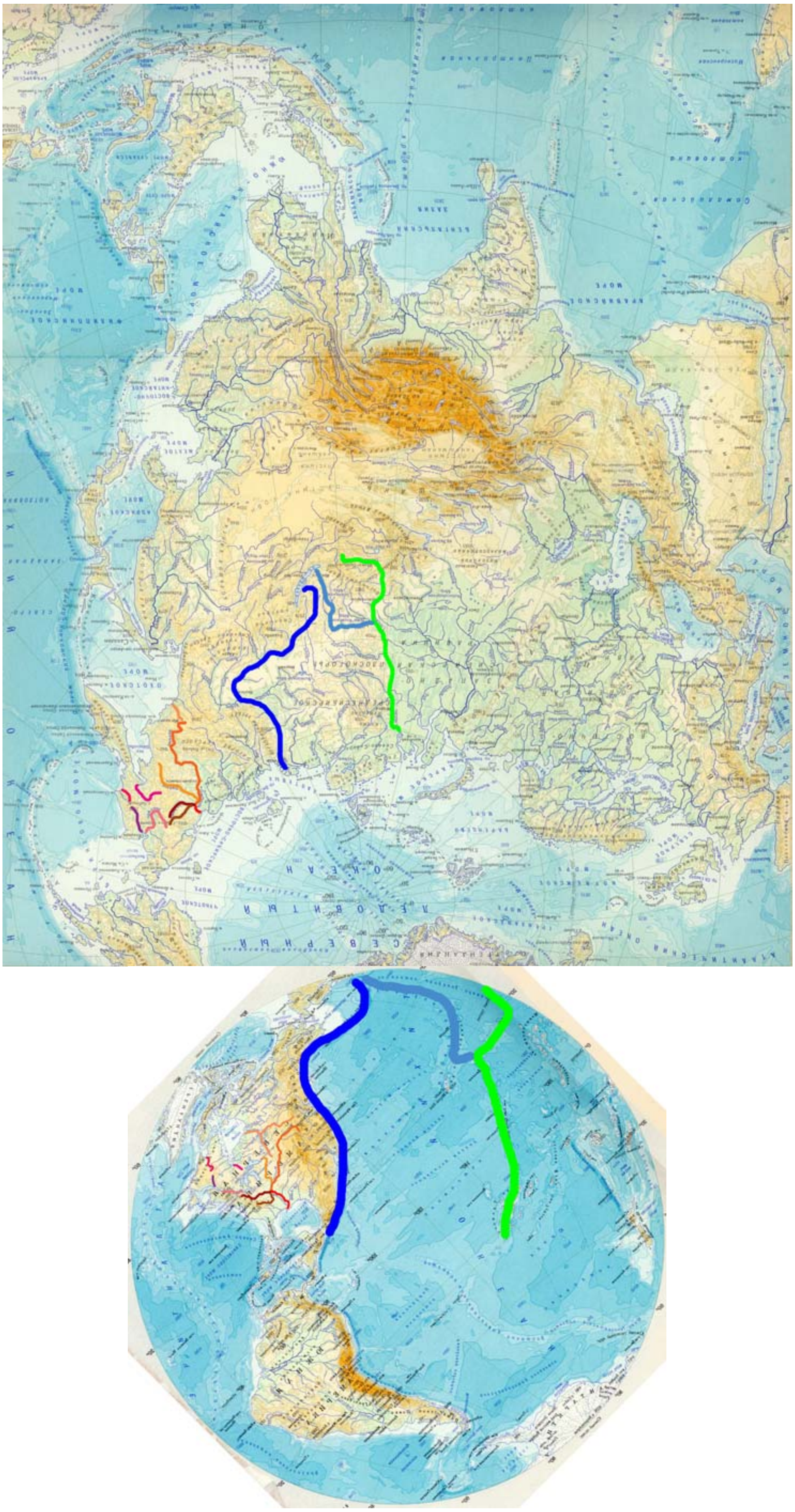

Fig. 1. Chukotka in Asia.

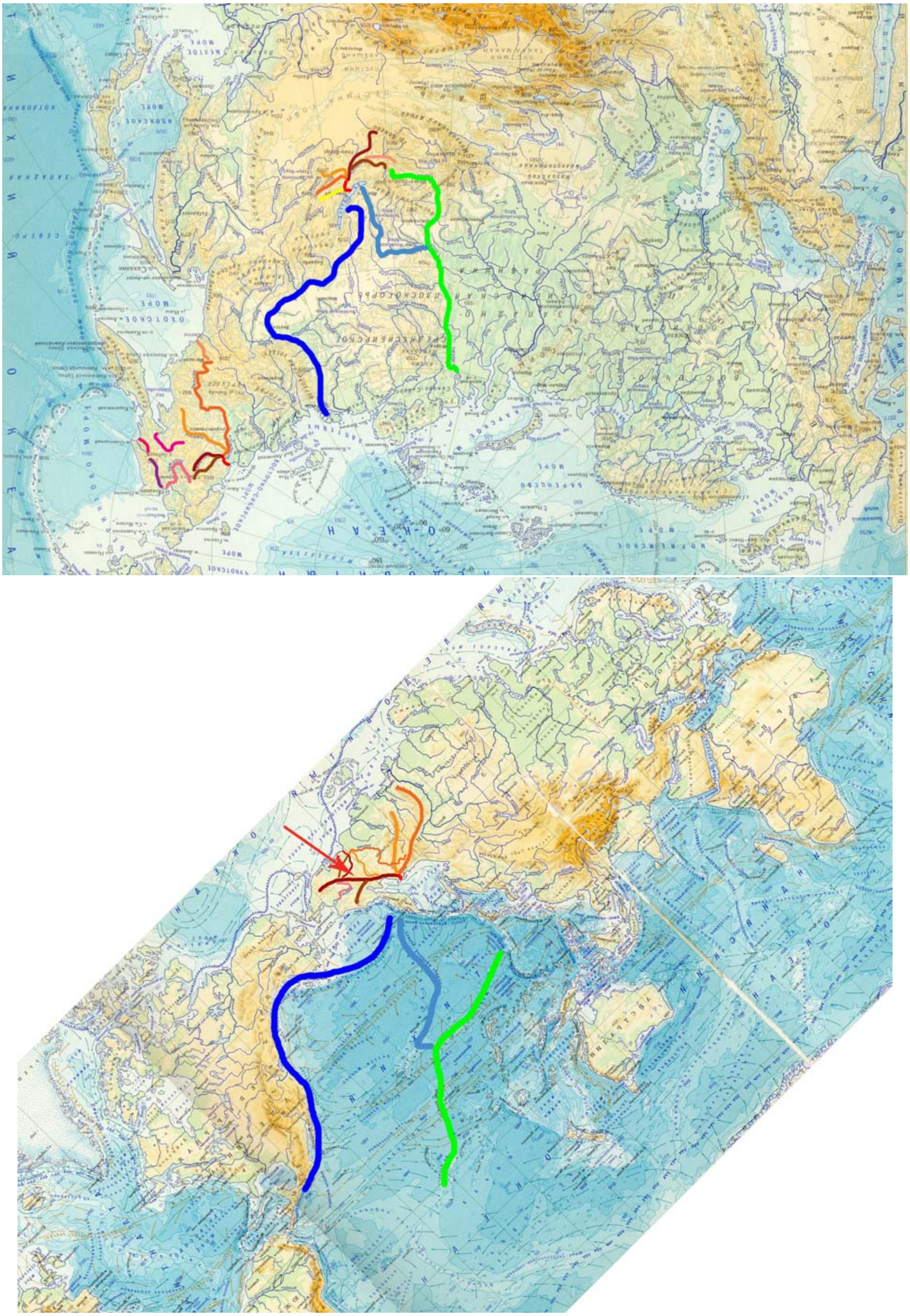

Fig. 2. The Magadan Mississippi is a convex up analog of the Baikal Mississippi (Fig. 4.3). It is dual to the Kolyma Mississippi (Fig. 5.1-5.2). Japan-Okhotsk Antarctida (Fig. 5.6) has reverse orientation with respect to Baikal. The Chukotkian Caspian Sea (convex up) (Fig. 5.2) is pointed by the arrow.

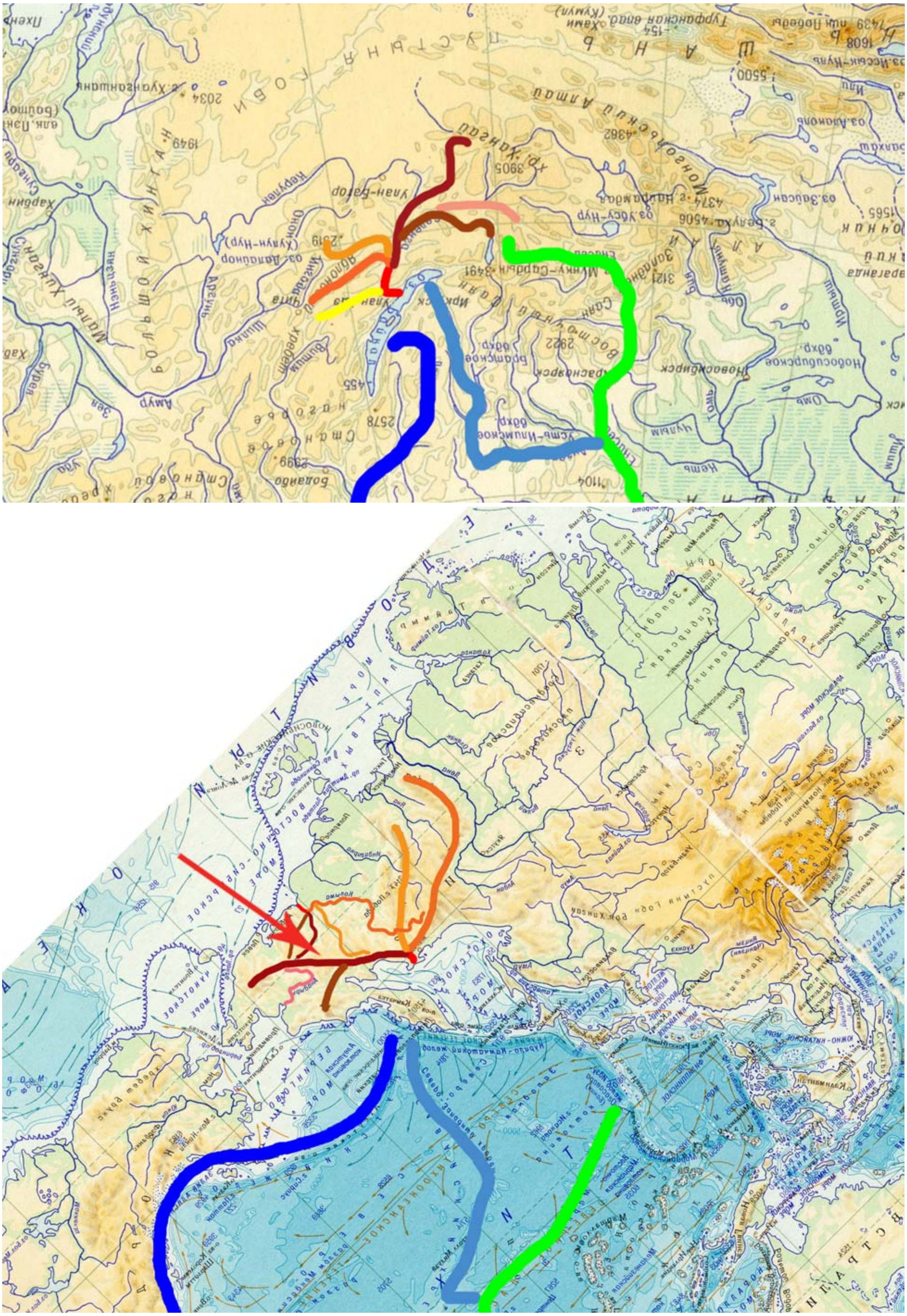

Fig. 3. The Baikal Mississippi and the Magadan Mississippi. Fragments of Fig. 2, enlarged.

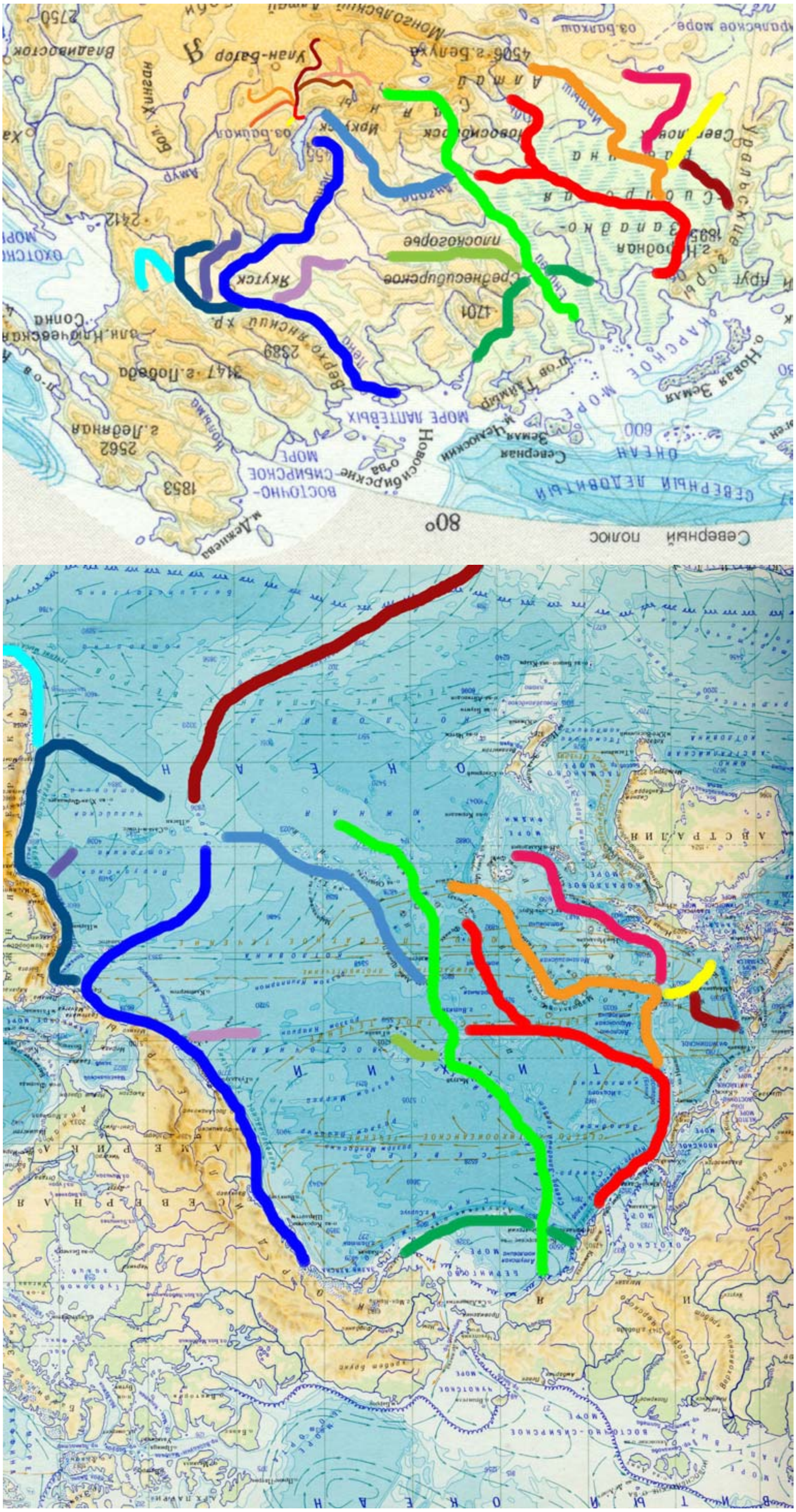

Fig. 4. [1:15, Fig. 6], 180^0-turned for comparing with Fig. 1. The Baikal Mississippi (upper) and it's analog in the South Pacific (lower) are added.

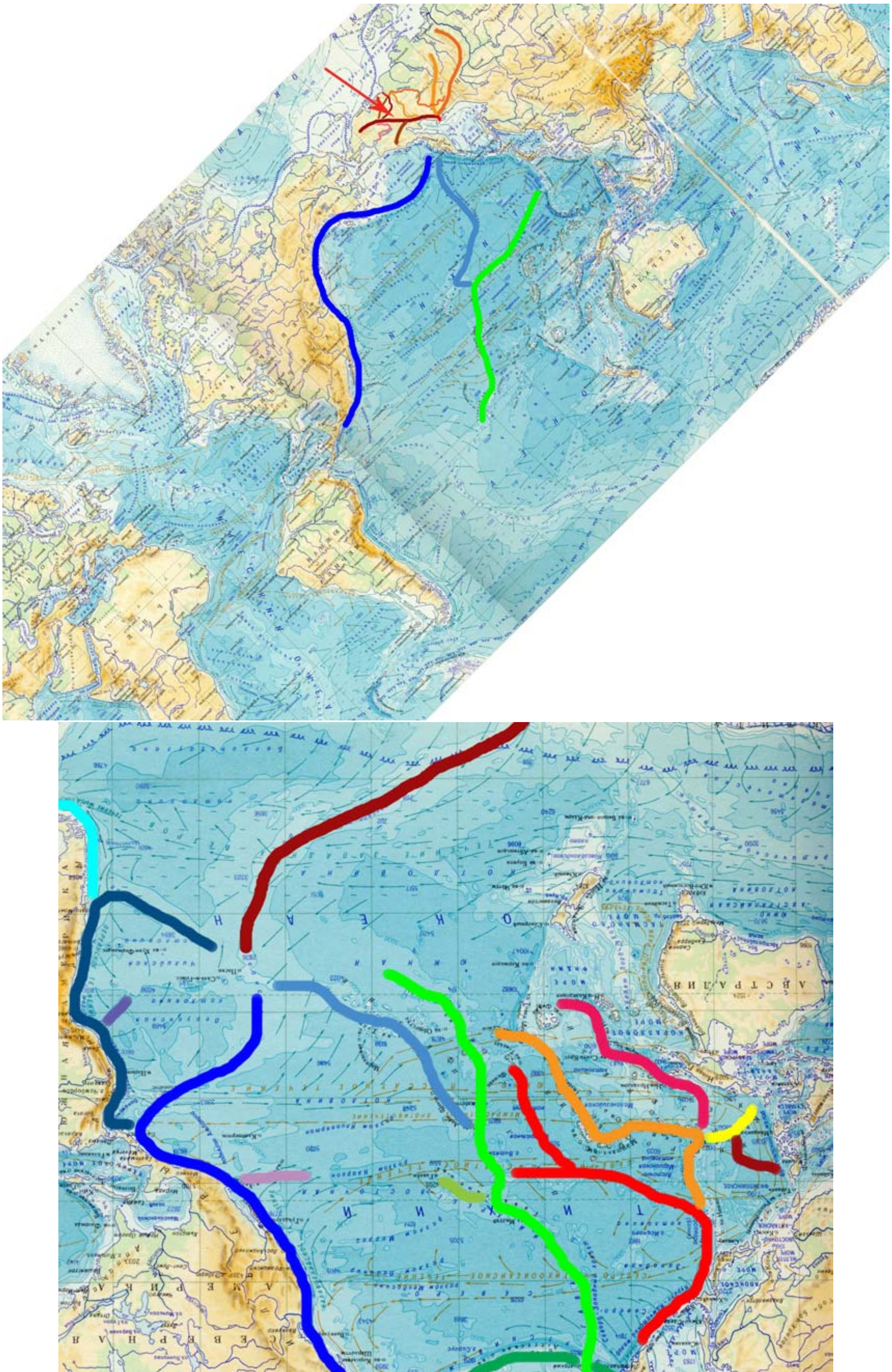

Fig. 5. The symmetry of the Pacific Ocean.

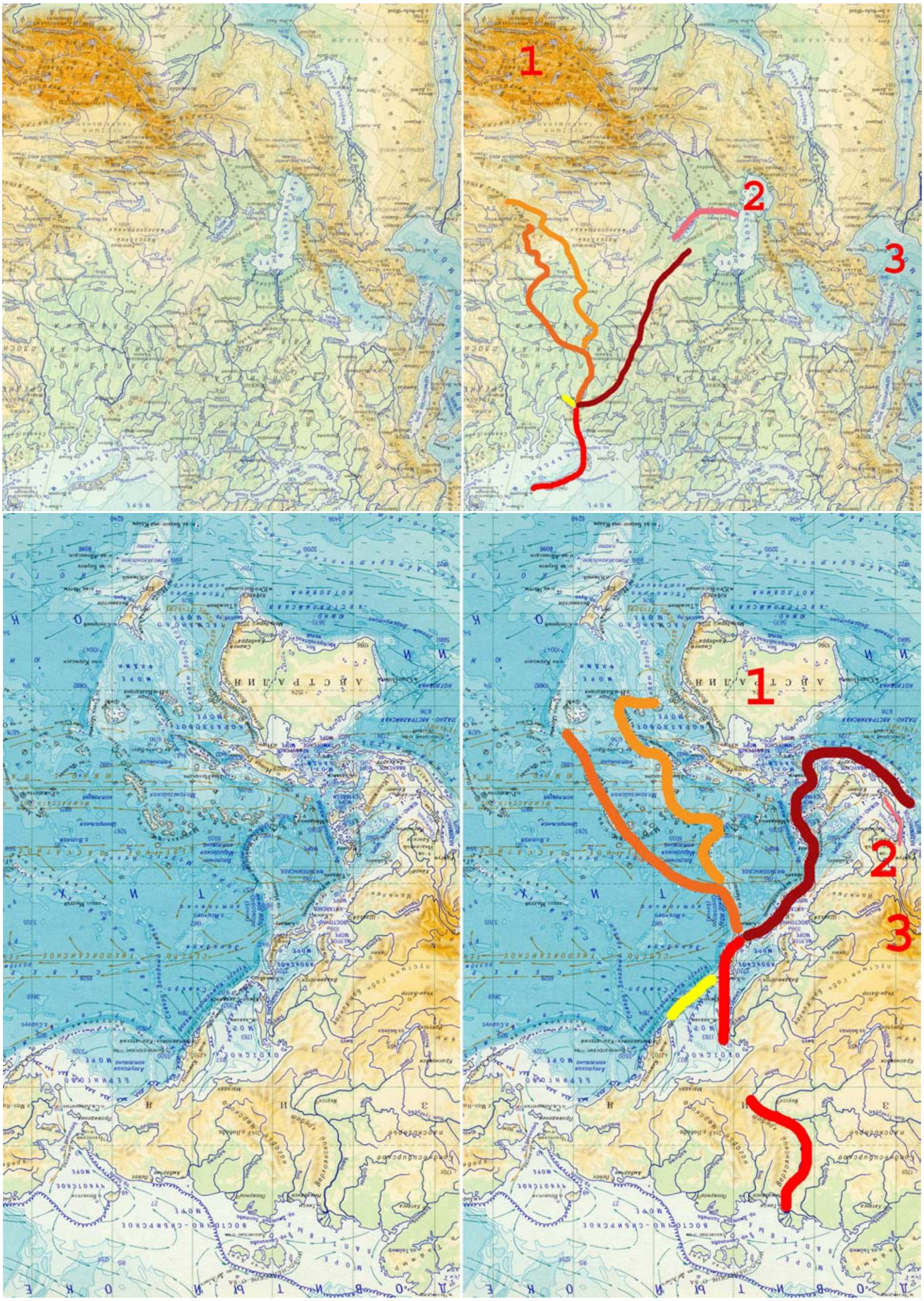

Fig. 6. By symmetry of Fig. 4 the Ob Mississippi (upper) is obtained from the Mariana Mississippi's pattern (lower) (Fig. 3.2). The Ob Mississippi contains not river bottoms only, but mountain ranges too. Recall (Fig. 5.7-5.8) that a Caspian Sea can be equipped with the Mississippi structure, and vice versa. See also [1:15, Fig. 1-2].

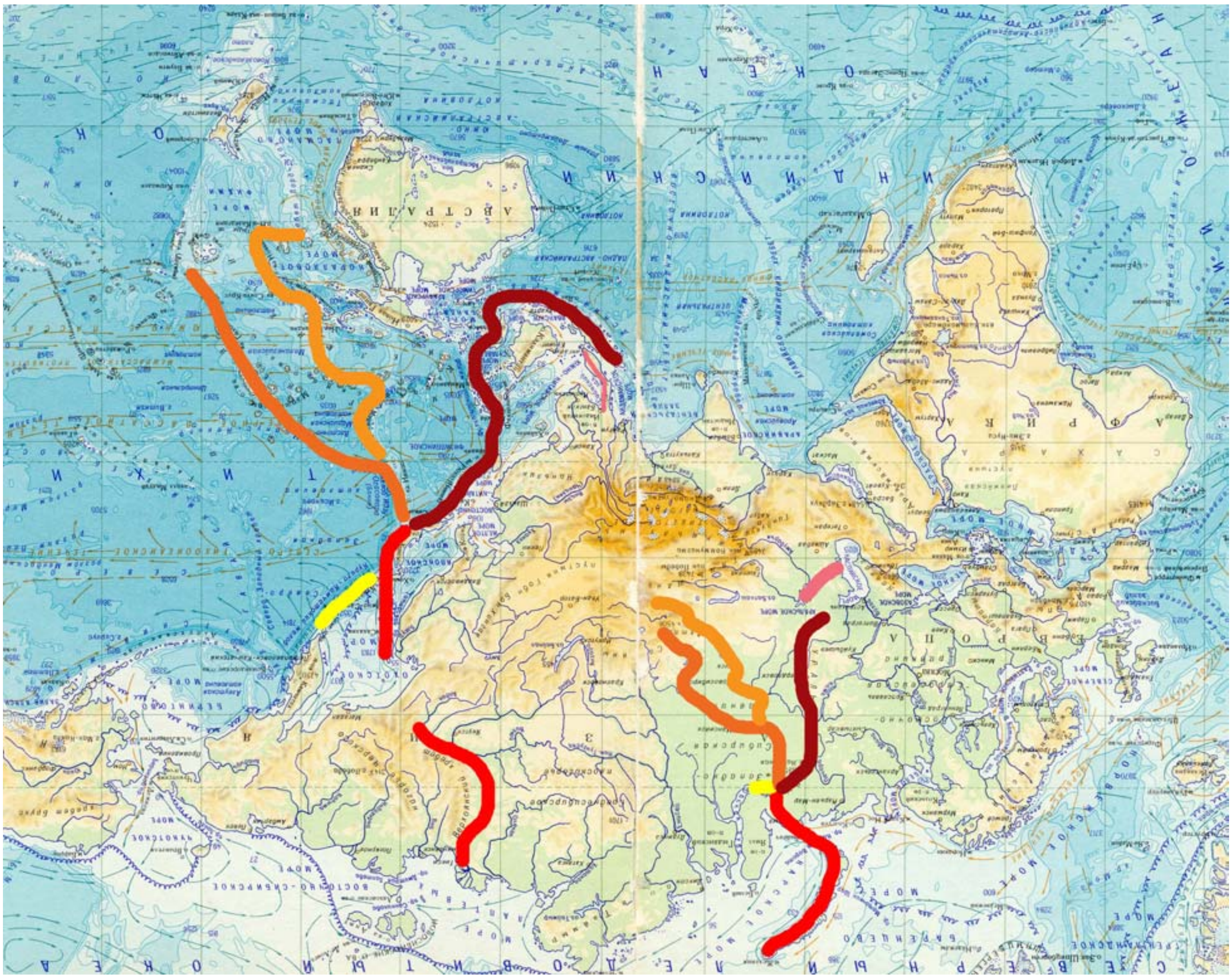

Fig. 7. The Ob Mississippi with it's neighborhood is conversed onto the Mariana Mississippi with it's neighborhood. See [1:15]. There exists the next sequence of flows: *the Mediterranean Sea – the Himalayas – Australia*, and also the Obian collection (*the Mediterranean Sea, the Himalayas*) is transferred onto the Mariannian collection (*the Himalayas, Australia*).

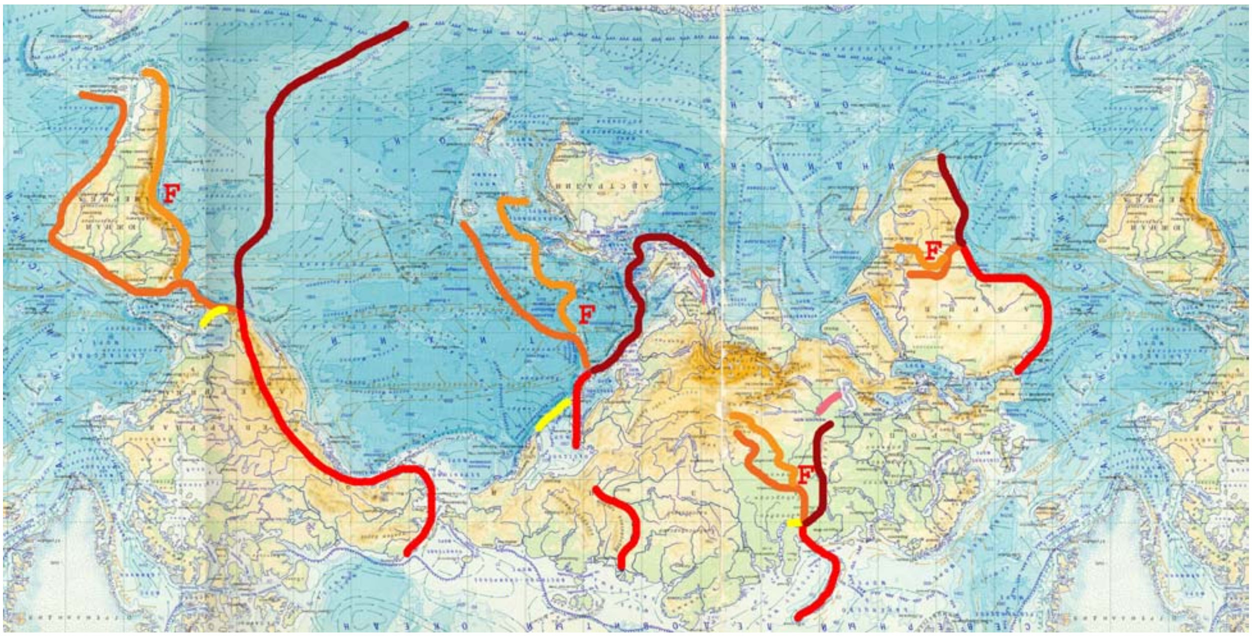

Fig. 8. A family of Mississippis. Caspian Seas of this Mississippis are (from left to right) Antarctida, Australia, the Himalayas, and the Kilimandjaro region. The similarity of the Ob Mississippi an the American Mississippi is outstanding; see also connections to their Caspian Seas (ends of orange and dark-red curves). Dark-red curves are prolongations of red curves.

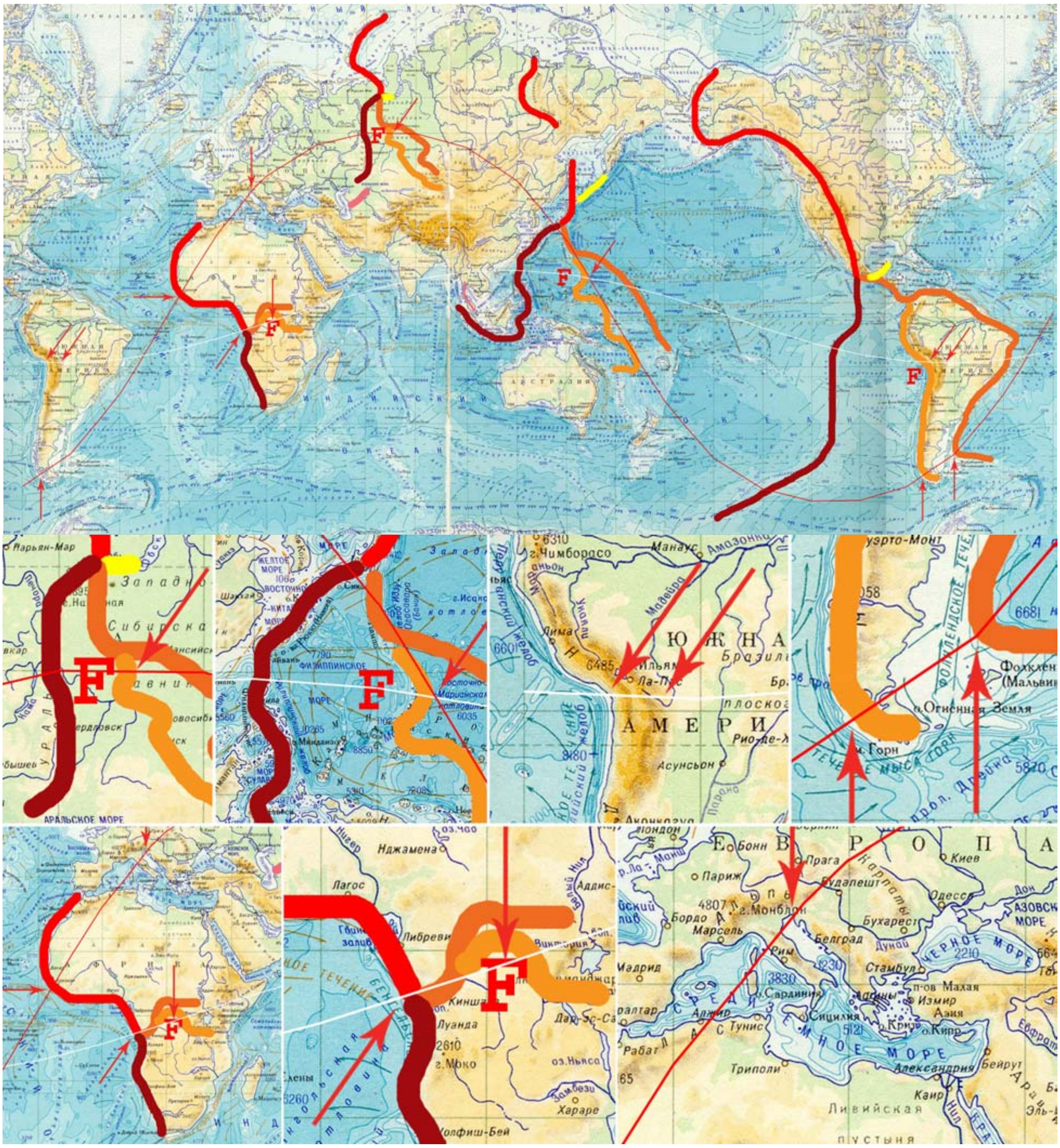

Fig. 9. White and red straight lines are directions of moving for Philippinian and Khanty-Mansian moving basins [1:15]. White straight line goes exactly through the center of Congo basin [1:15, Fig. 4; 1:6, Fig. 5-6]. The red straight line goes exactly through the center of the Baikal Circle [1:8, Fig. 3]. Also: a) white straight line goes through the concavity of South America and through the corresponded Eastern convexity of the Andes—in extremal points of these concavities-convexities, and also through the concavity of Africa (Congo River's mouth) —in a nearly extremal point; b) the red straight line goes through the convexity of Philippinian moving basin—in the extremal point, and also through convexities of Tierra del Fuego, Western Africa, the Mediterranean Sea's Adriatica [1:4, Fig. 21 left]—in extremal points. Therefore, by drawing a straight line through extremal points of two appropriated convexities one can reveal elements (F) and other interesting details, and also correlations between them. For example, French-Italian coastline of the Mediterranean Sea is an element (F), and red straight line goes through the extremal points of Philippinian and Khanty-Mansi moving basins. On elements (F) see Fig. 2.2-2.3, [1:15].

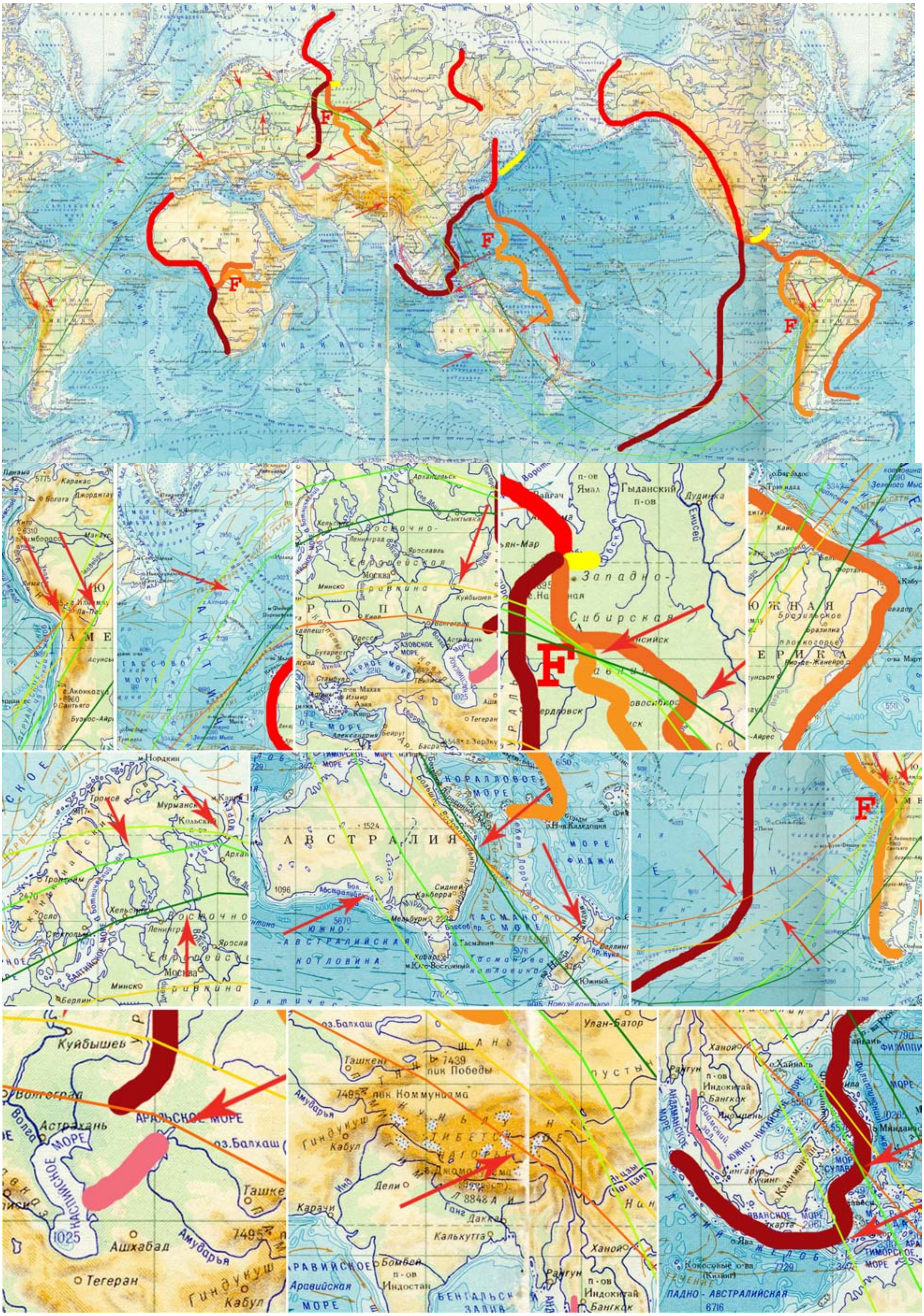

Fig. 10. There are also some straight lines, going through extremal points of convexities (the convexity of Australia is added, see [1:7]). These straight lines allow to reveal some F-like objects (see Fig. 9). For example, the dark-green straight line goes through equivalent convexities of the Ob River and of South America, and also through the convexity of Baltic's F-element (see Fig. 2.2-2.3).

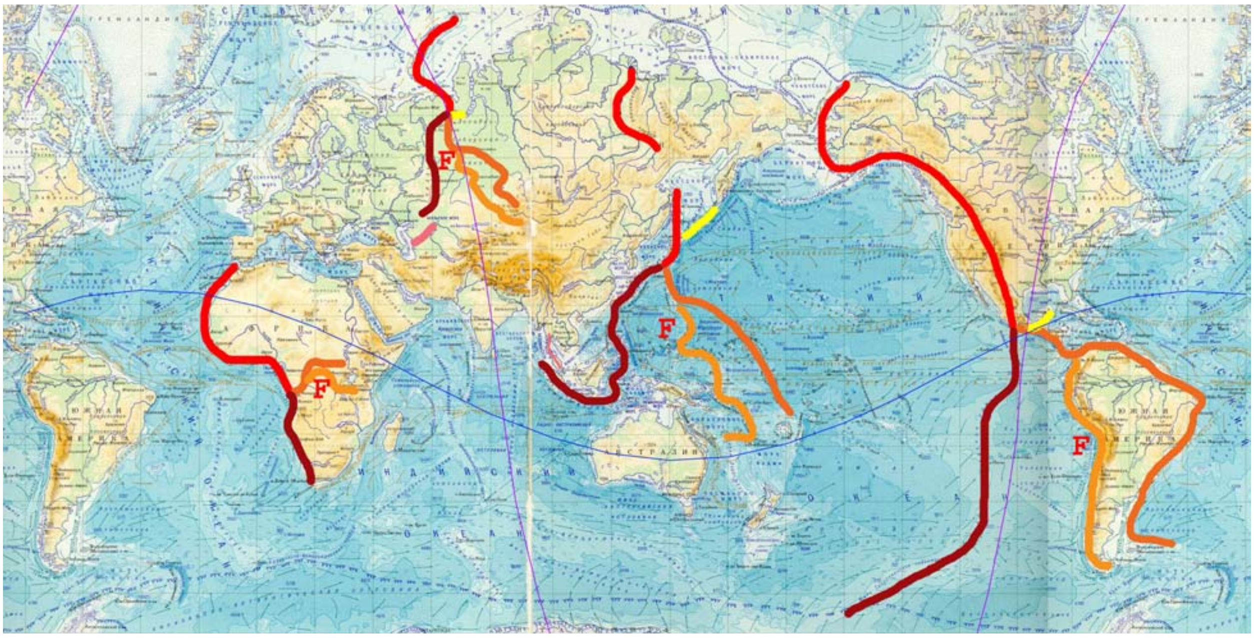

Fig. 11. Violet magenta straight line is drawn through extremal points of convexities of Khanty-Mansi moving basin and the Mississippian Mississippi (North America). This line goes also through extremal points of convexities of Antarctida (Fig. 12) and Hudson Antarctida. Blue straight line is a direction of moving of Australia; it is drawn through the center of Australian (π – 3)-circle [1:7, Fig. 3, 6] and its extremal point of convexity (Brisbane). Violet magenta and blue straight lines' intersection point is a Y-node of the American Mississippi. Violet magenta straight line goes through Y-nodes of both the Ob Mississippi and the American Mississippi.

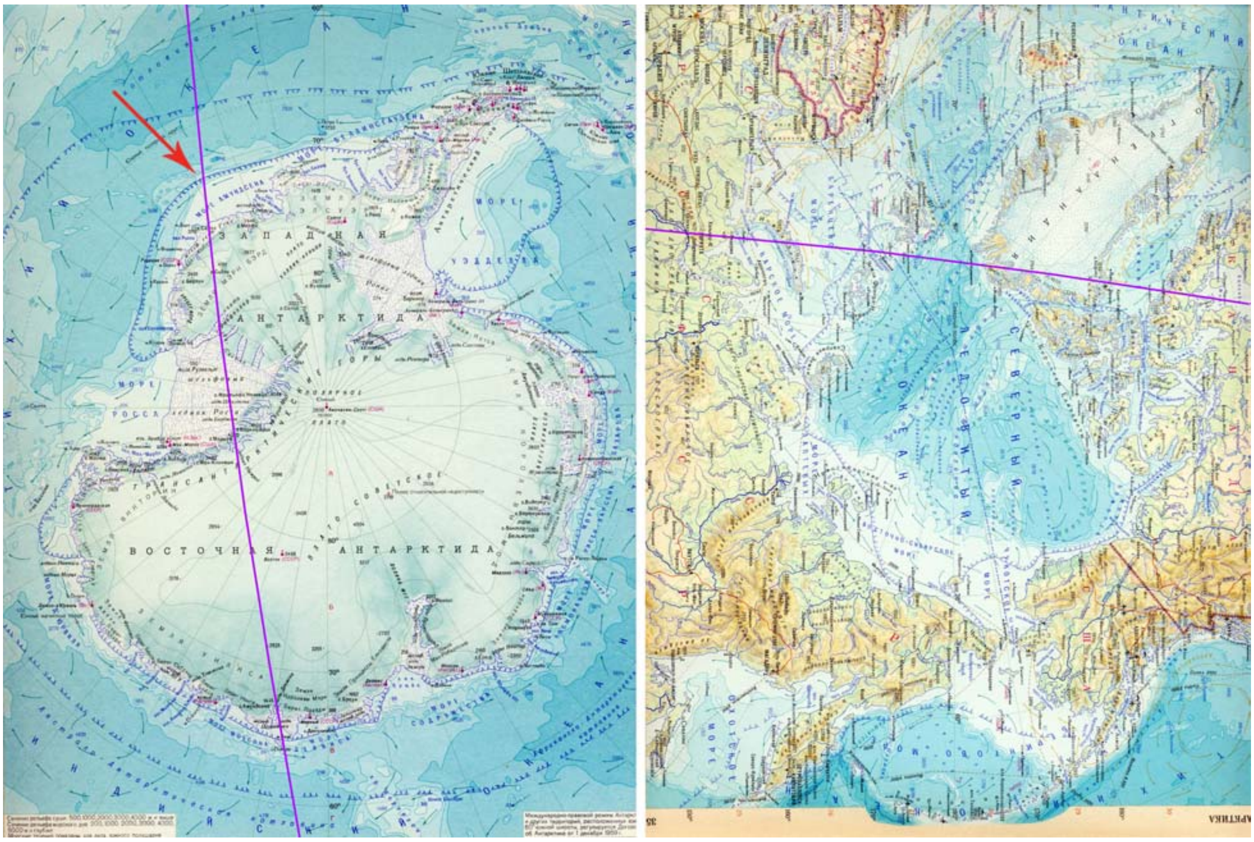

Fig. 12. Violet magenta straight line (Fig. 11) in polar regions. The line goes through the extremal point of convexity of Antarctida.

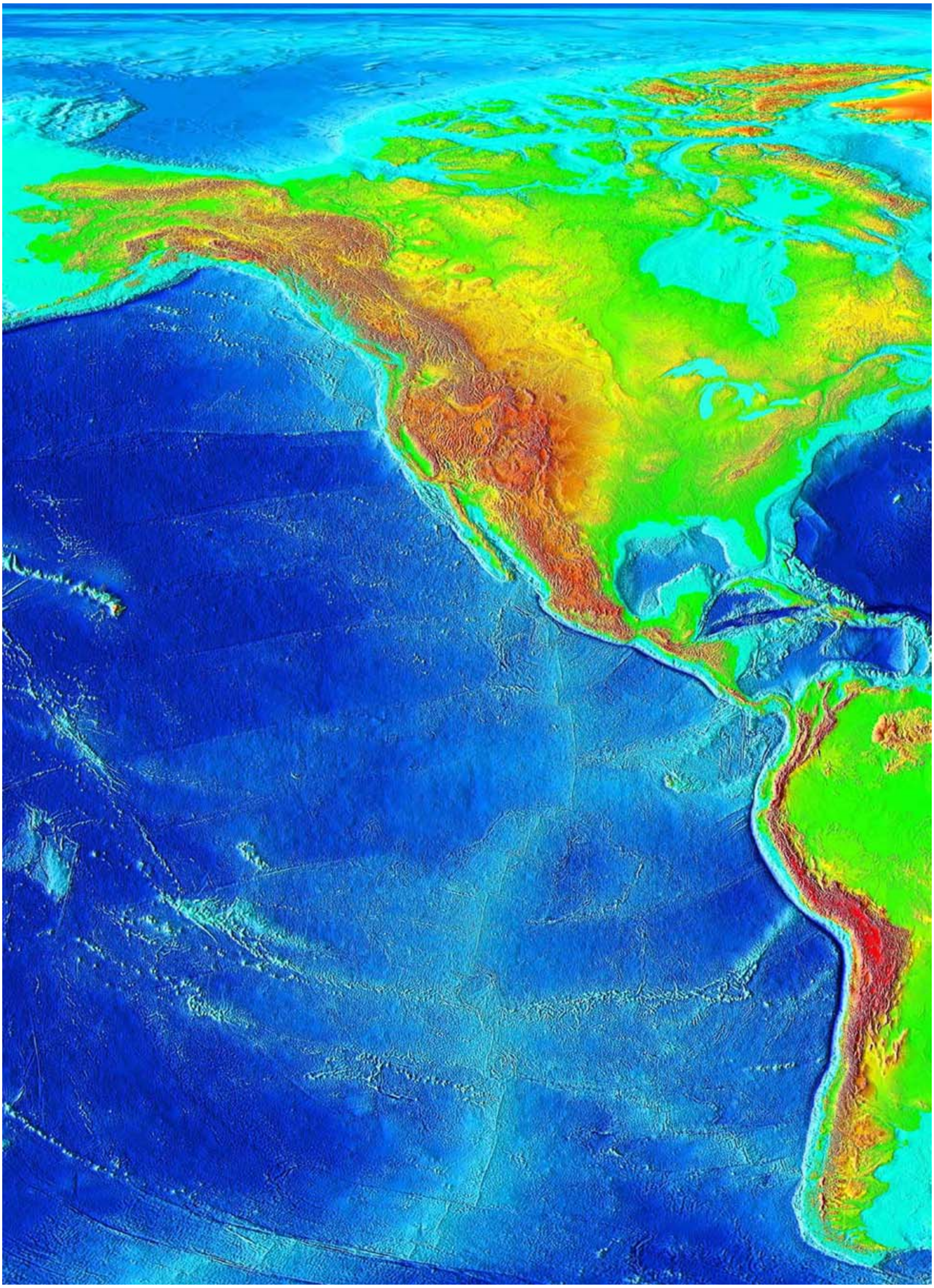

Fig. 12. How the "middle range" of the Pacific Ocean is connected to California (Fig. 8-11).

7. American Mississippis

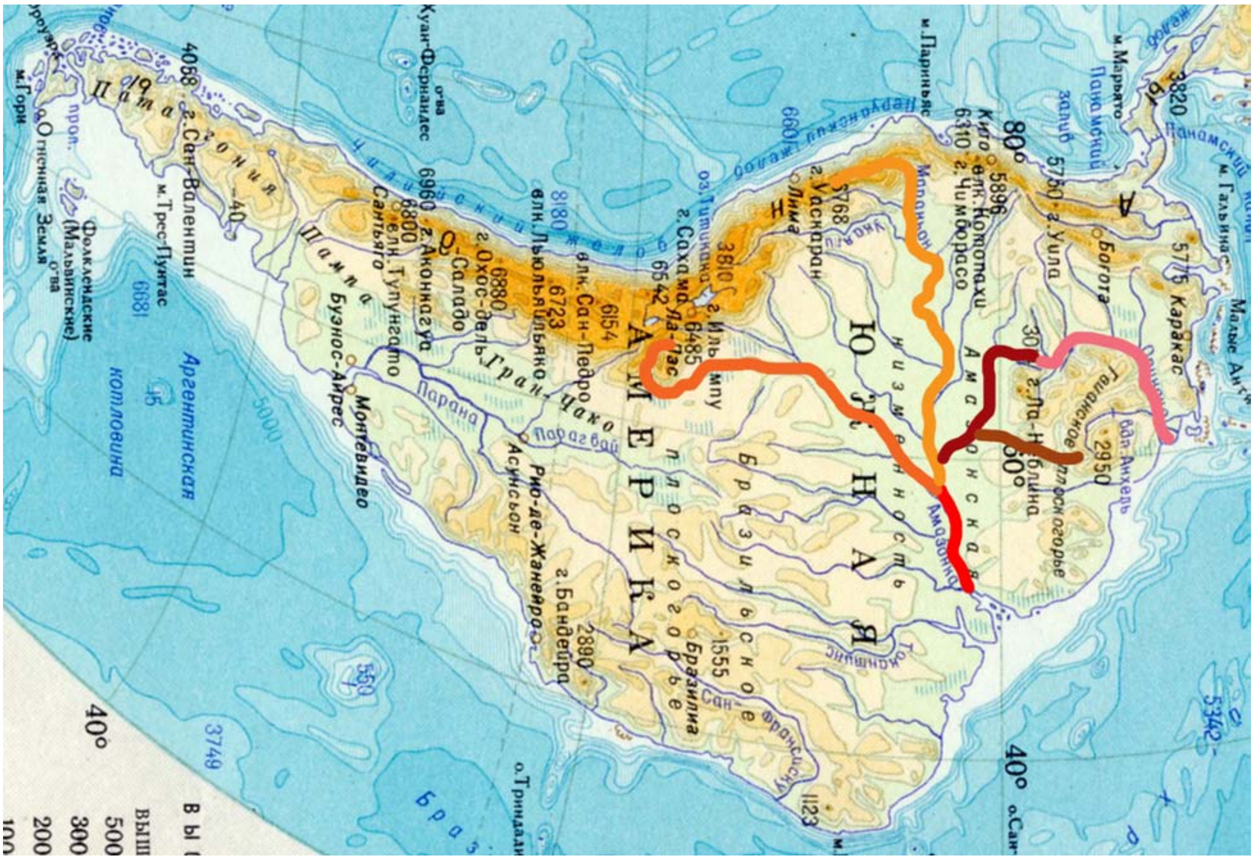

Fig. 1. The Amazon Mississippi.

Fig. 2. The Paraguay Mississippi.

Fig. 3. The Columbia Mississippi.

Fig. 4. The Aldan Mississippi is an analog of the Columbia Mississippi.

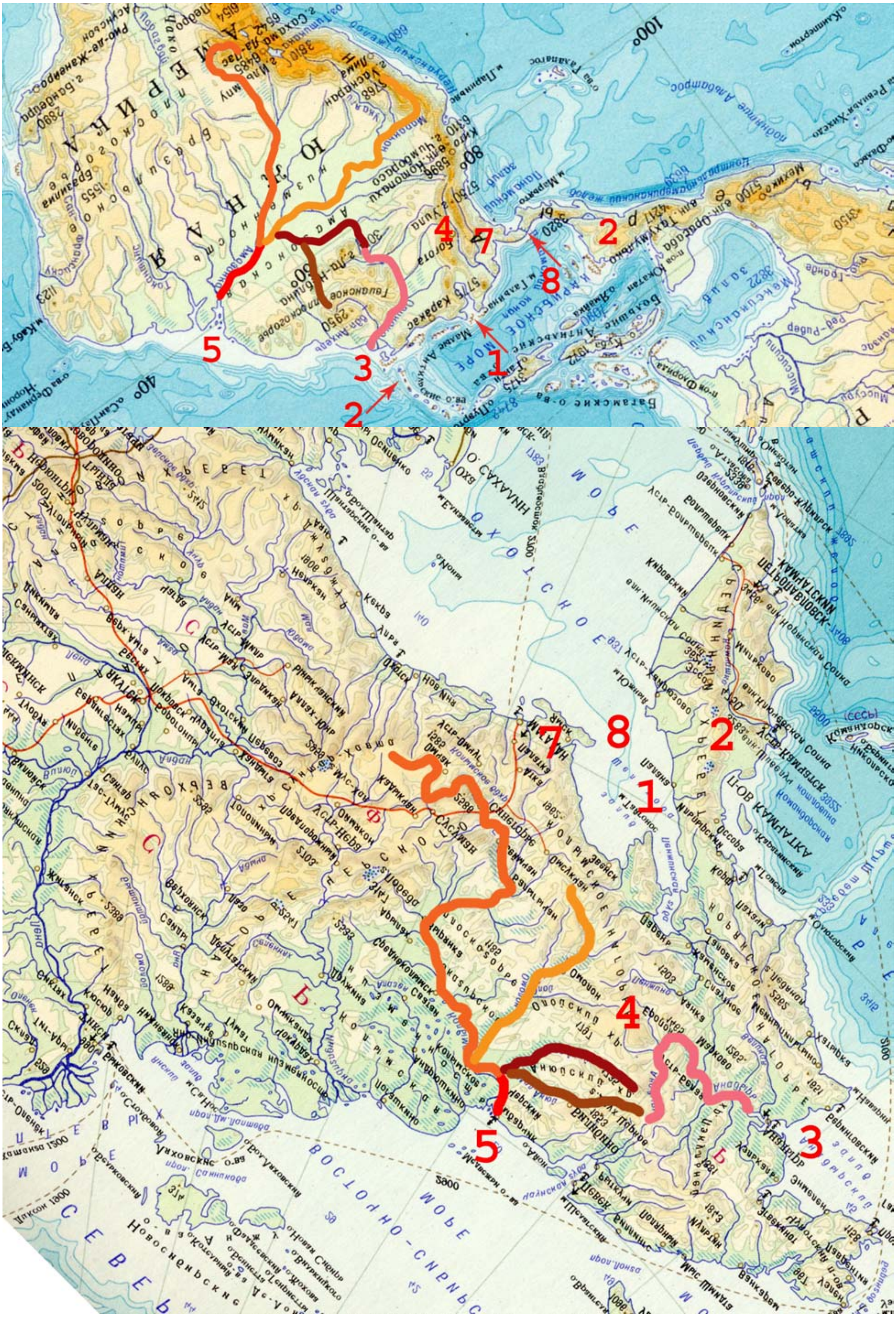

Fig. 5. The Andes are the Caspian Sea of the Amazon Mississippi. The Andes are attached to the Gulf of Venezuela (1) by the Kolyma Mountains (Kolymskoe nagorie) pattern (Fig. 5.11, 6.2).

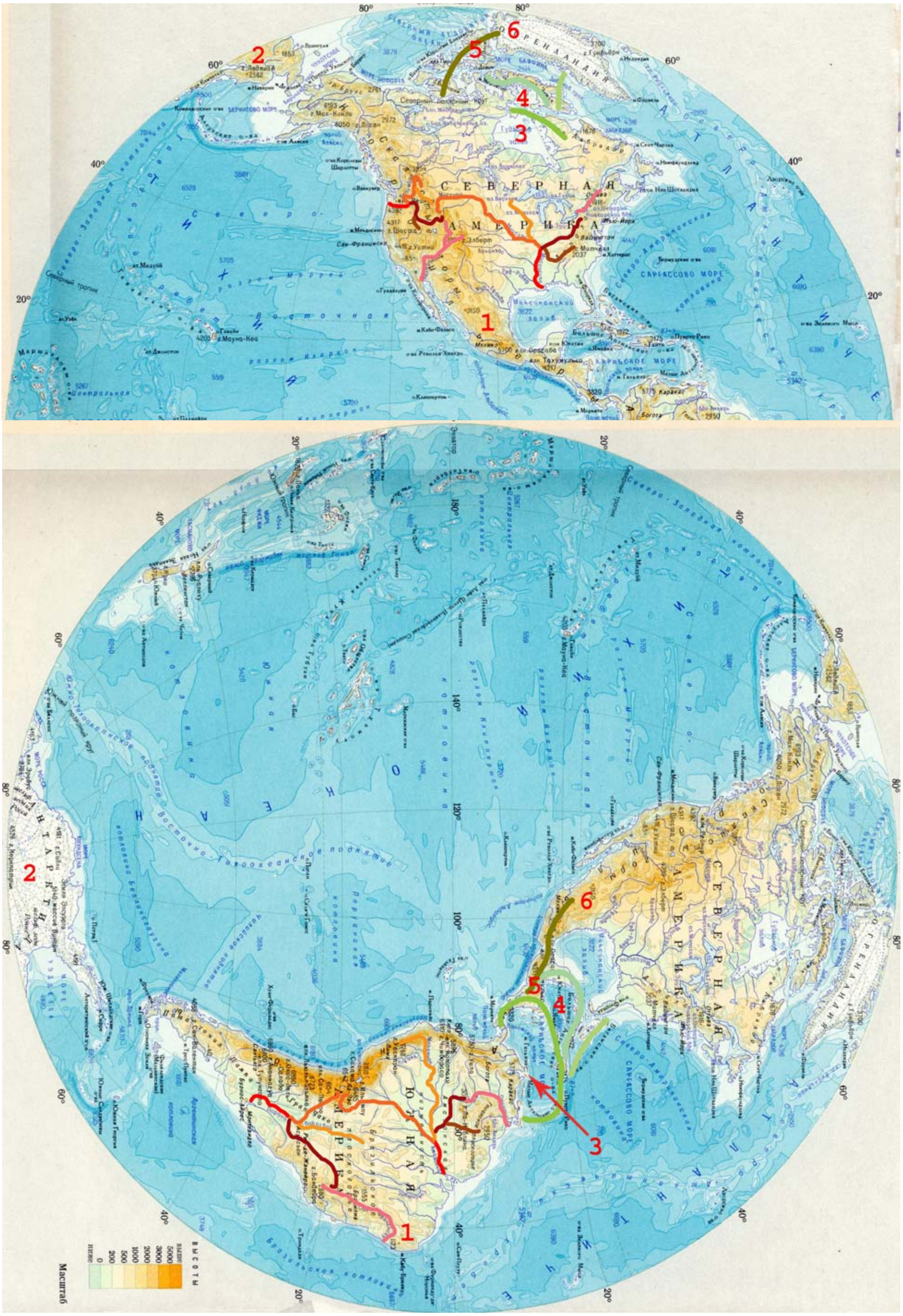

Fig. 6. North America and South America are the two versions of the same structure. See also (Fig. 3.9). The Gulf of Venezuela is pointed by the arrow (Fig. 3.4 right).

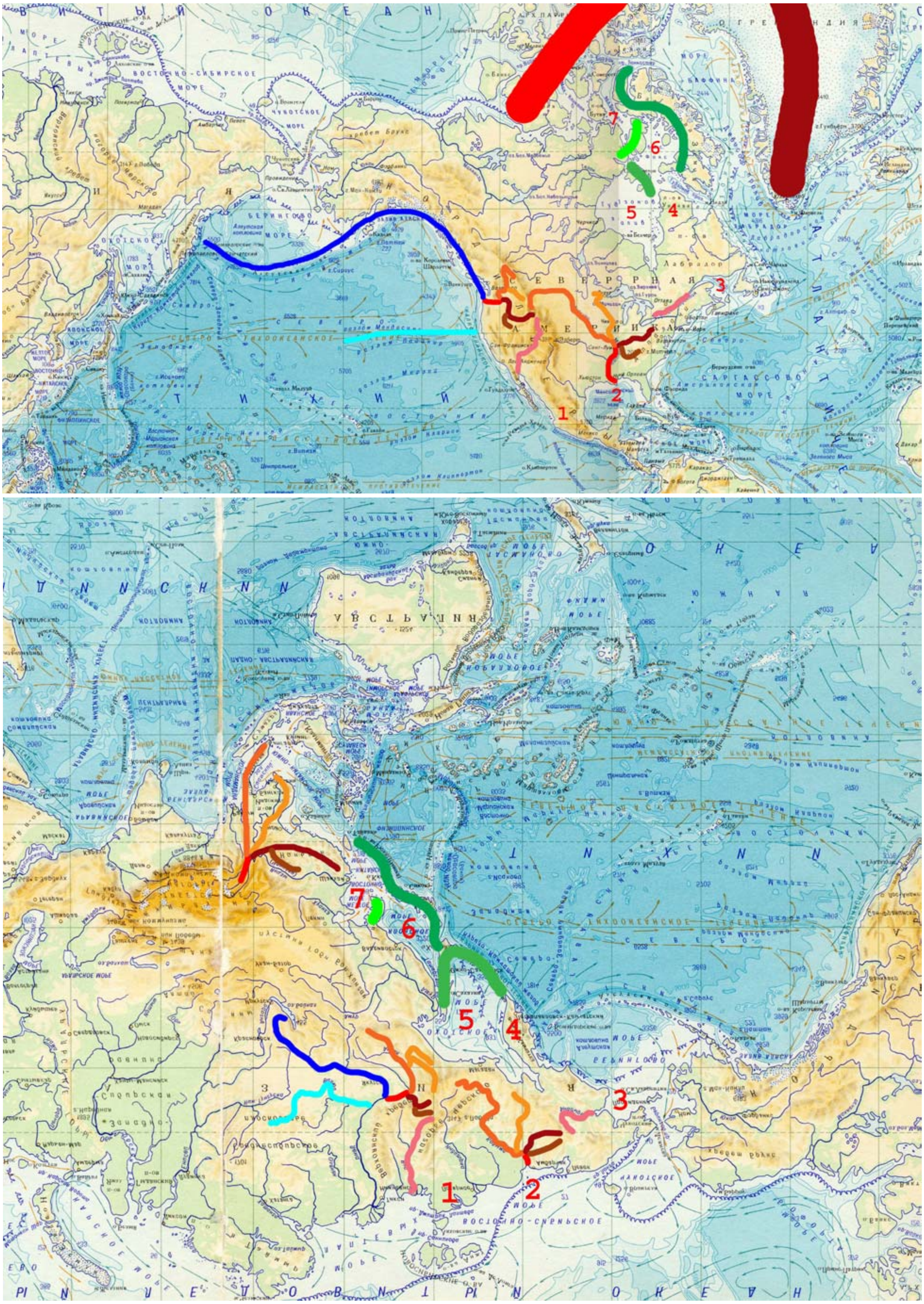

Fig. 7. North America and Chukotka. See Fig. 3.9, [1:5]. Chukotka is flowing out from Alaska (lower). The analog of Chukotka (North America) (upper) is flowing out from South America, not from Greenland. Therefore Alaska isn't an analog of Greenland (here we take into account sequences of flows).

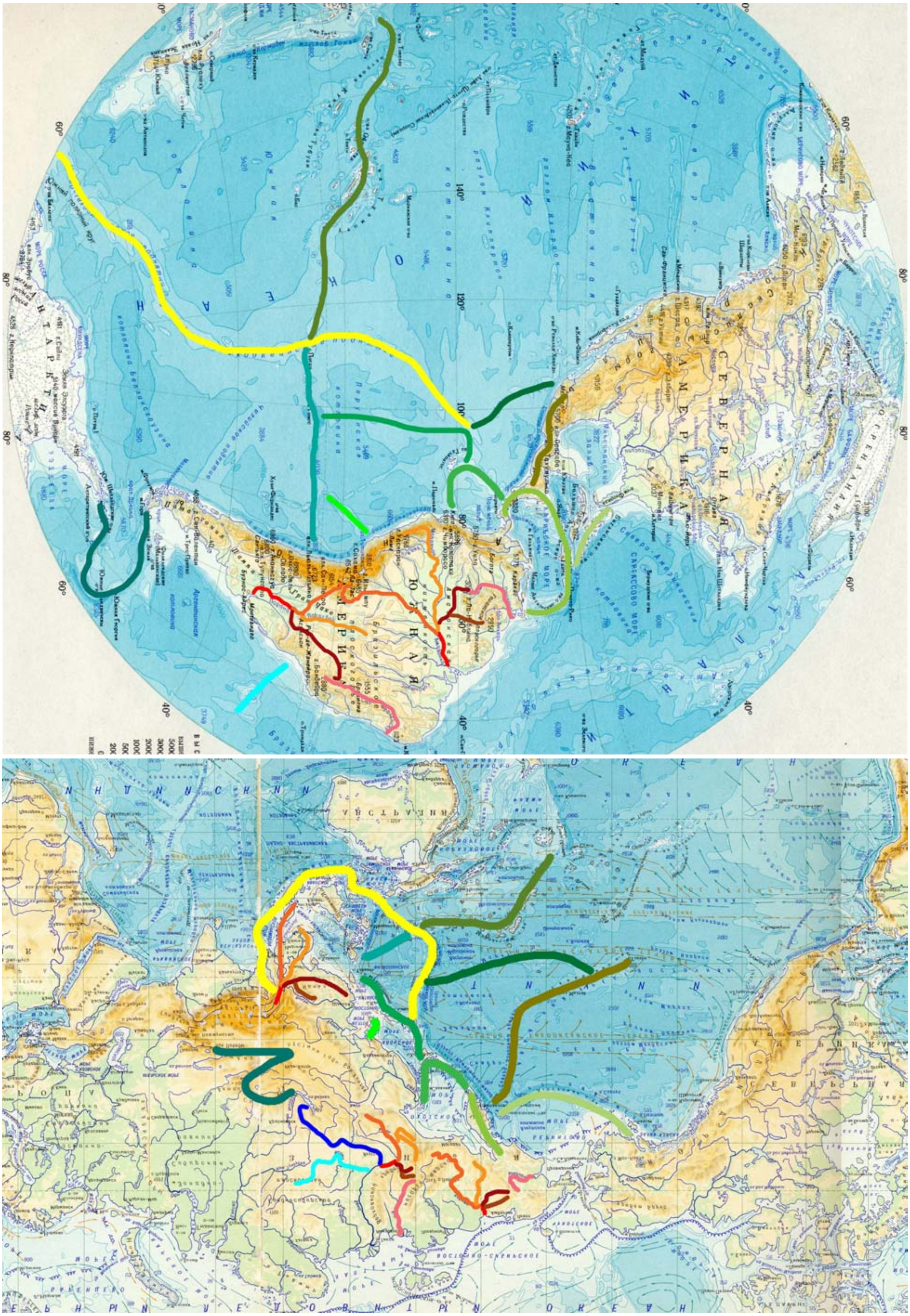

Fig. 8. South America and Chukotka. Antarctida corresponds to the Himalayas. See Fig. 4.5-4.6, [1:5, Fig. 6].

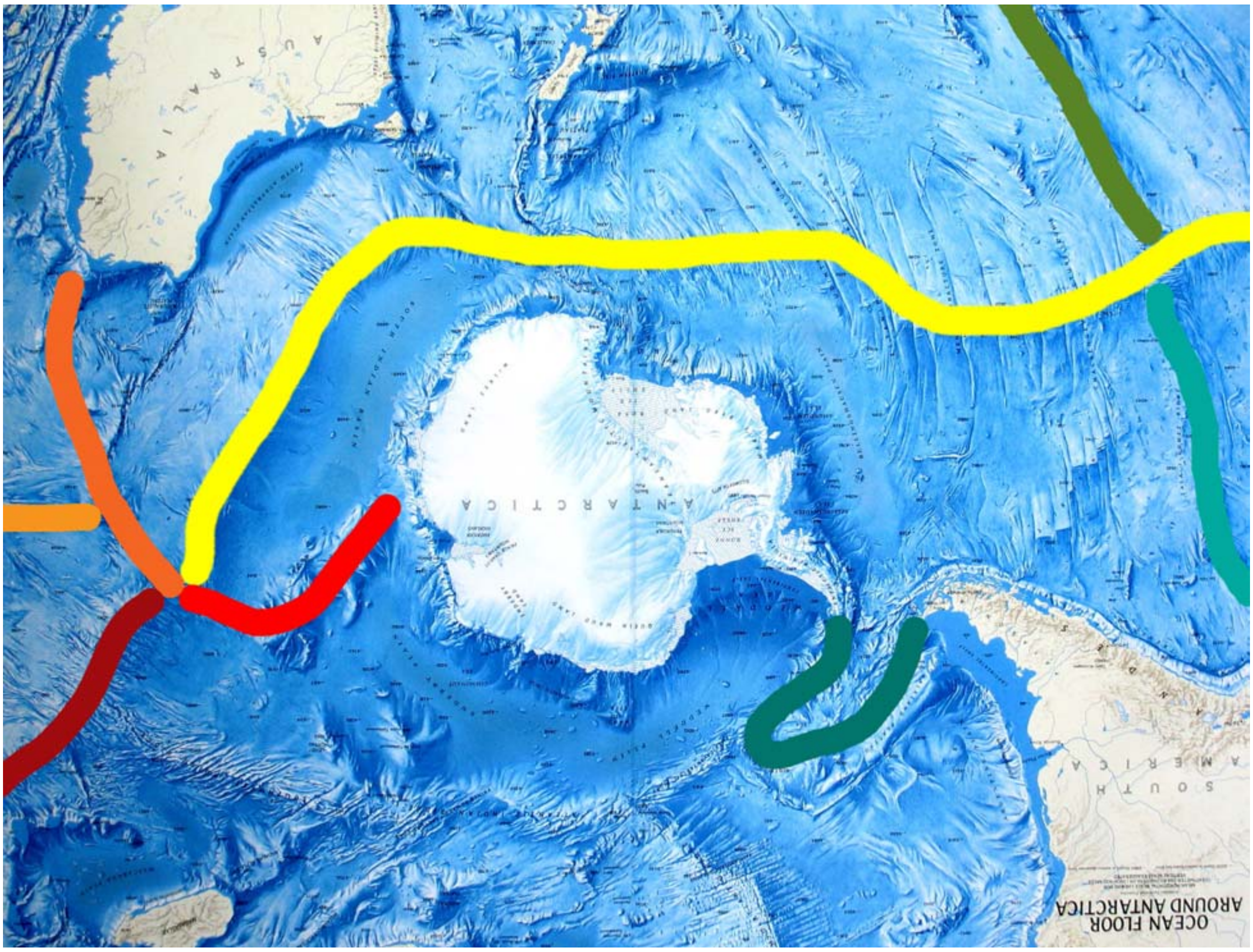

Fig. 9. Oceanic ranges of South America in Antarctida's neighborhood.

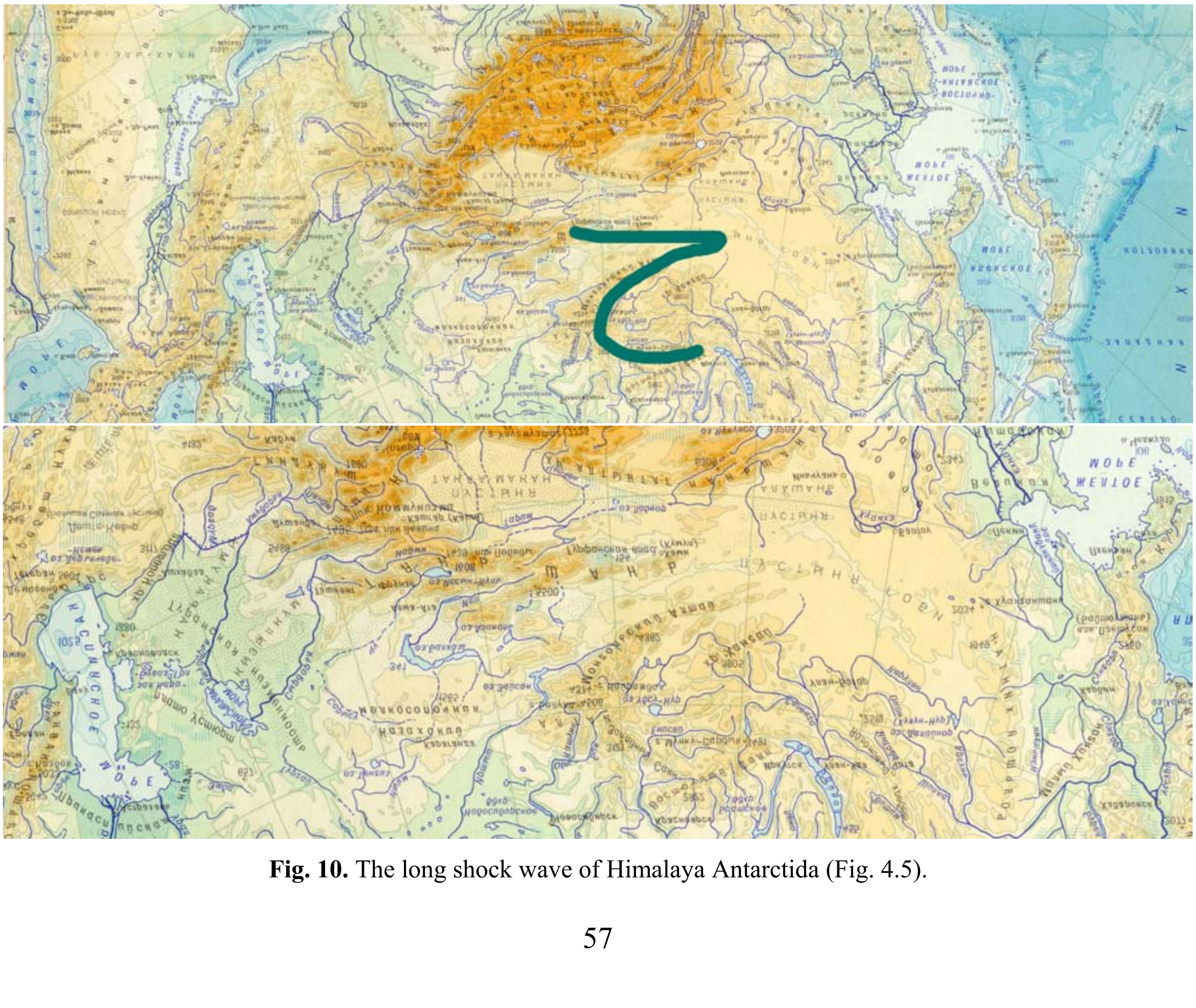

Fig. 10. The long shock wave of Himalaya Antarctida (Fig. 4.5).

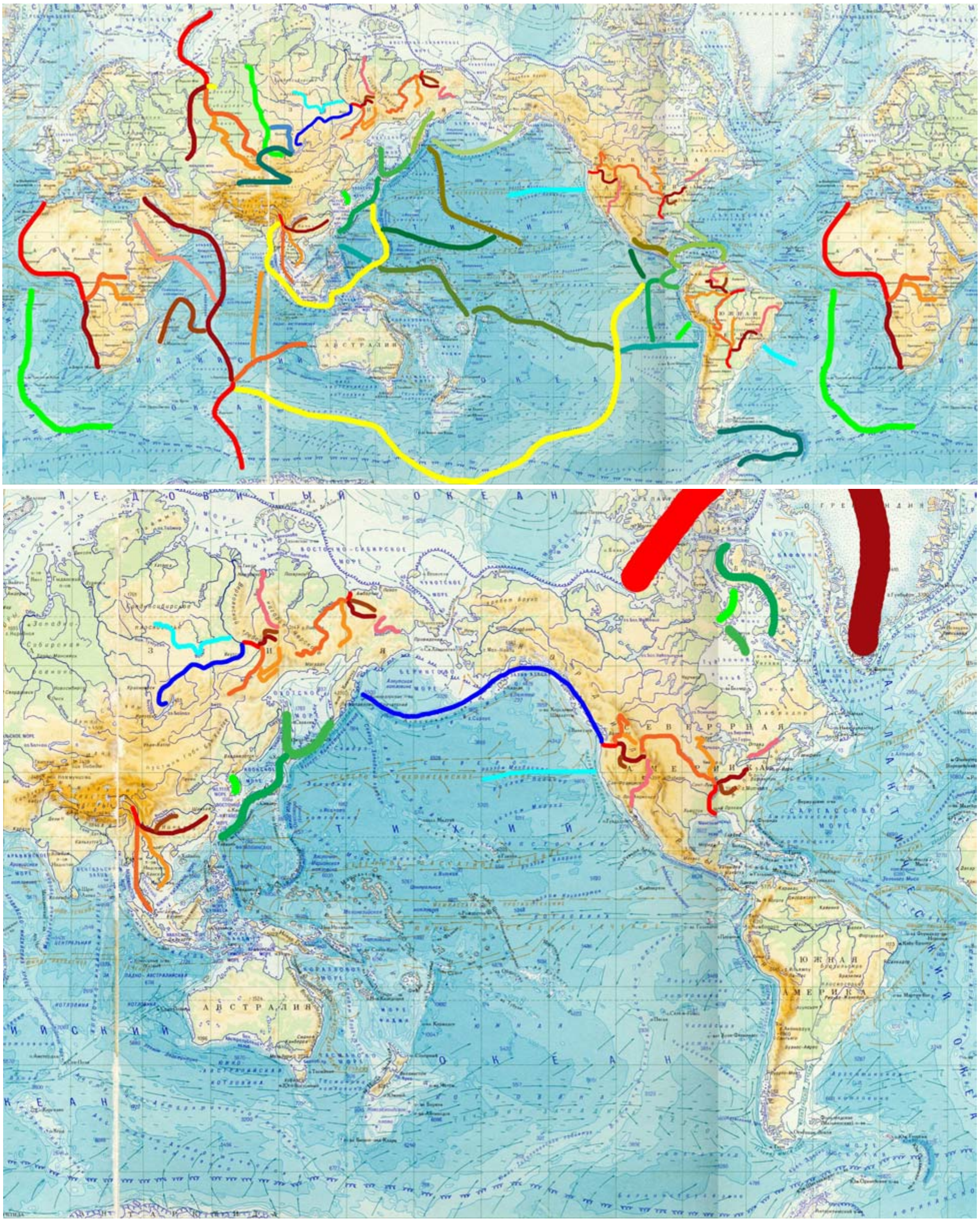

Fig. 11. Upper: South America and Chukotka. South America and Siberia. Each yellow curve connects it's Kamchatka to the root of the dark-red branch of the corresponded Mississippi. Kalimantan (Borneo) is corresponded to Australia. See Fig. 6.7. **Lower:** North America and Chukotka.

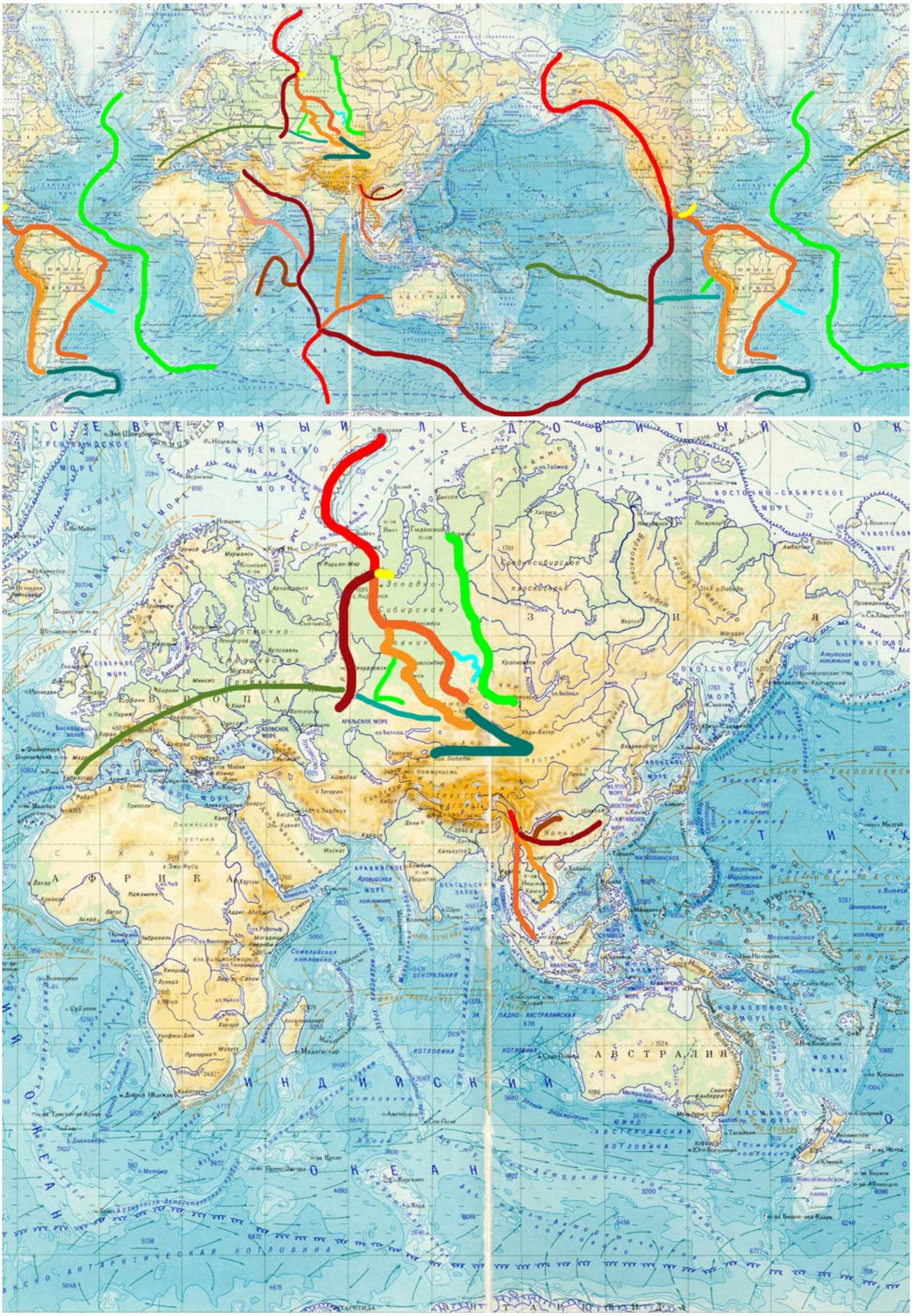

Fig. 12. Upper: The Ob Mississippi and the American Mississippi (Fig. 6.7). **Lower:** The Ob Mississippi.

8. Central elements

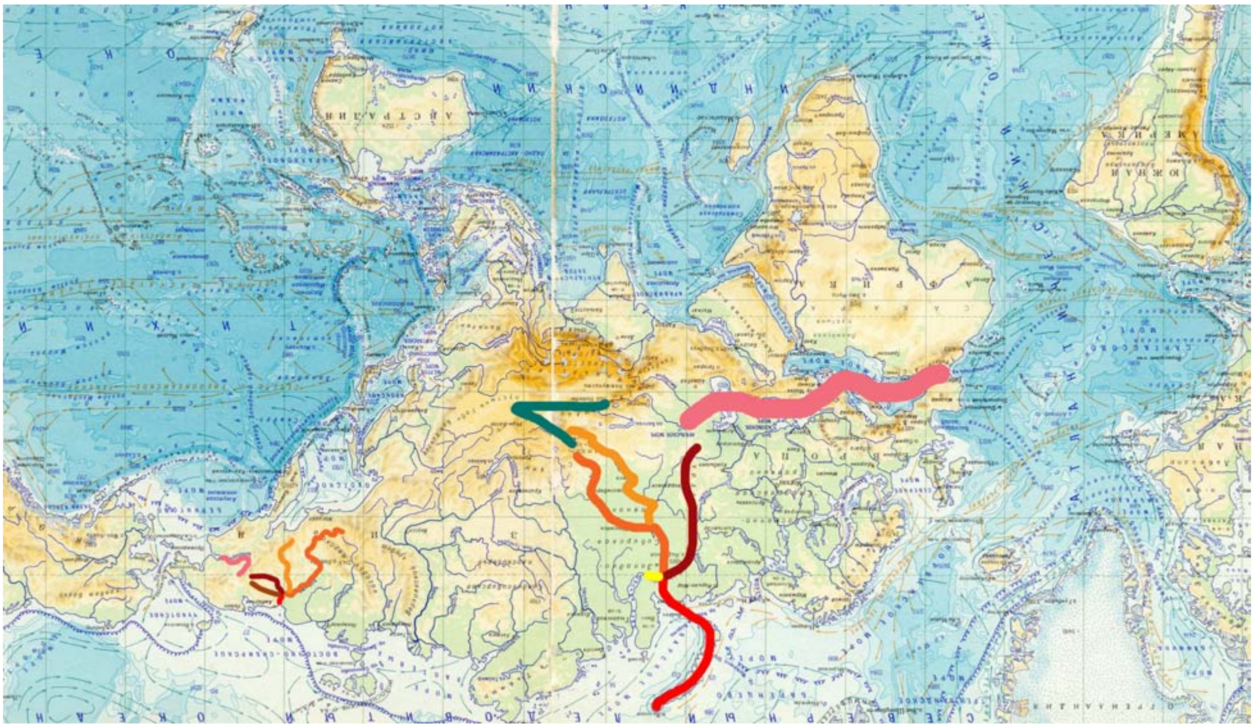

Fig. 1. Let Eurasia be equipped with a two-Mississippis structure (with two side Bays of Biscay, see Fig. 2.5, 2.8). This structure has reflectional symmetry (recall that North America and South America have symmetry of translation). By this symmetry the Sea of Okhotsk can be considered as an Antarctida itself, without the Sea of Japan. Okhotsk Antarctida's orientation is reflectionally symmetric to the Himalayas, it's head is the Shelikhof Gulf, it's long shock wave is the Penzhin River, it's Mississippi is the Amur River.

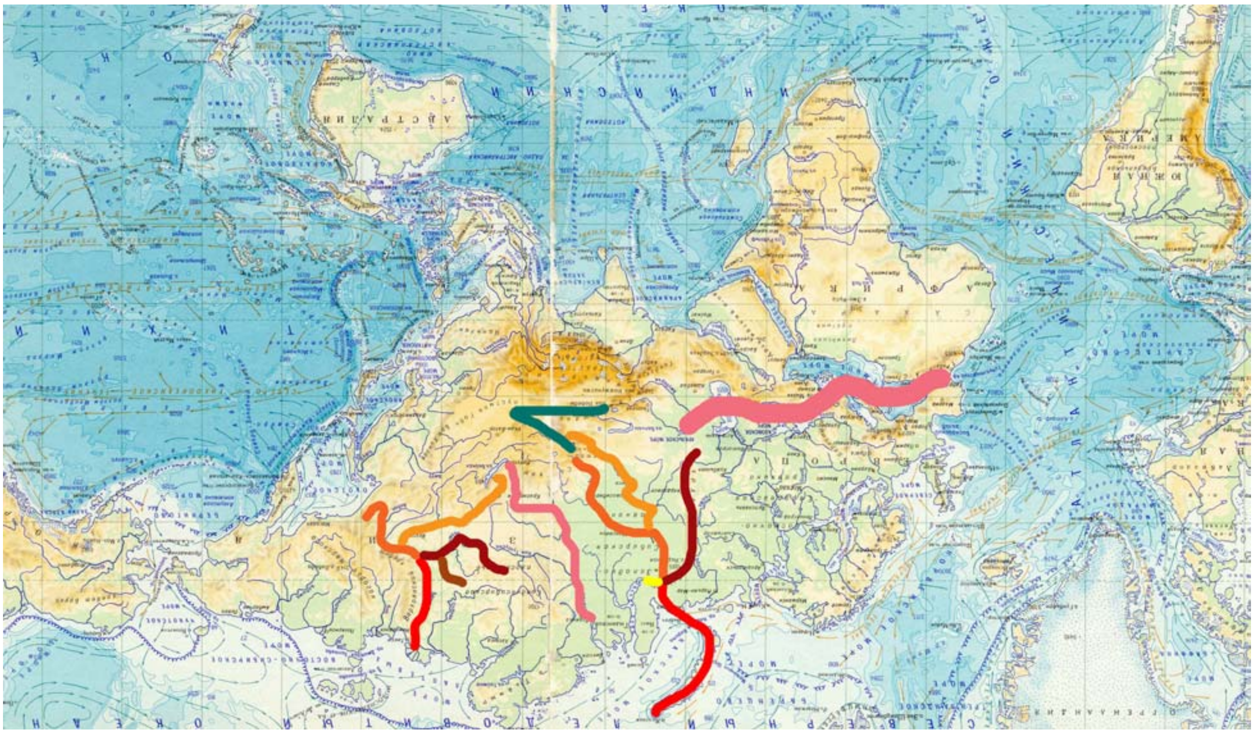

Fig. 2. Such two-Mississippis structure on Eurasia is analogous to North America, as far as to South America (Fig. 7.6). The Yenisei River (it is a Mediterranean Sea here) properly is ended by Lake Baikal (Fig. 2.4). The Lena River is connected to Lake Baikal by the yellow-orange branch, as far as the Mississippi is connected to Great Lakes. The red-orange branch is connected to Okhotsk Antarctida. Okhotsk Antarctida is an analog of Australia from Fig. 3.1.

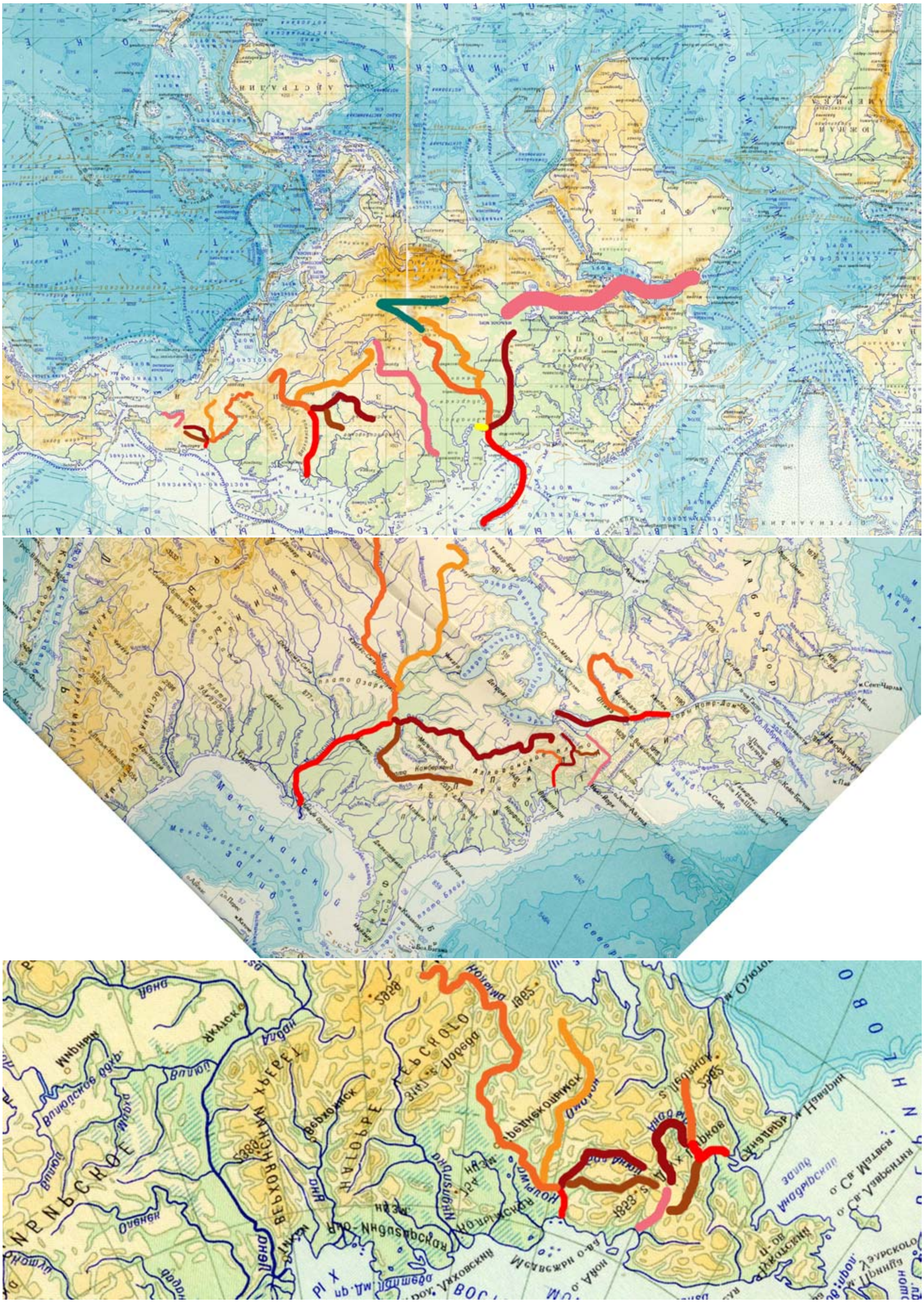

Fig. 3. This three-Mississippis structure on Eurasia seems to be better. The Kolyma Mississippi is reflectionally symmetric to the Lena Mississippi, as far as to the Ob Mississippi. The bunch *the Lena River + the Yenisei River* is analogous to the bunch *the Susquehanna River + the Hudson River* (center) or to *the Chaun River's basin* (lower), but side Mississippis are turned inside out. See Fig. 5.4-5.5.

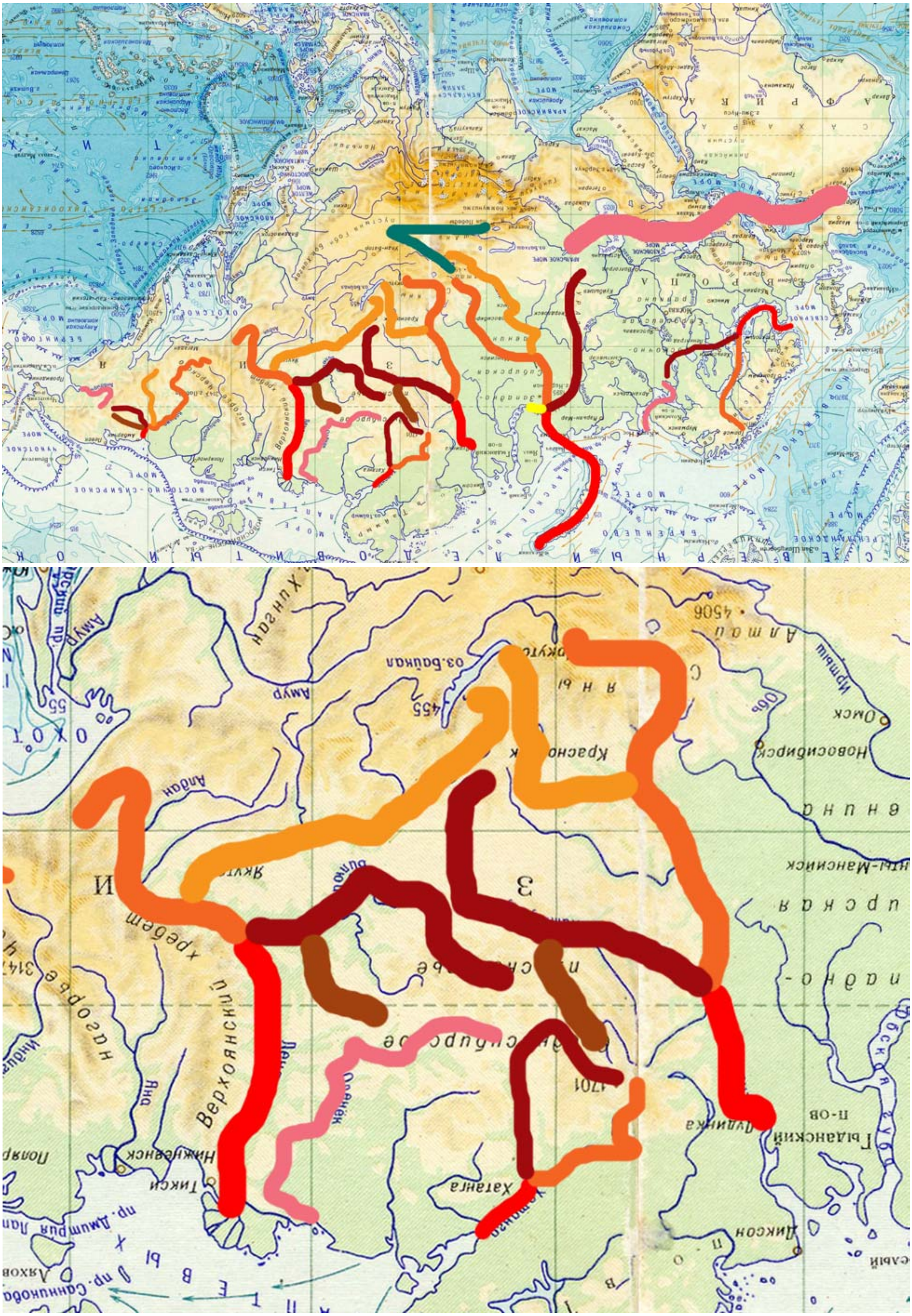

Fig. 4. By Fig. 3, more detailed fractal levels are considered.

Fig. 5. North America, the Great basin. North is left. The Basin moves from above downwards (from East to West). The Columbian Mississippi (The Columbia River + the Colorado River) the central element (the Sacramento River) isn't forked. More precisely, it is forking on the land. The Caspian Sea of the Columbian Mississippi is the Great Salt Lake and it's neighborhood, it is a prolongation of the head fold of the Basin. See [1:8, Fig. 12-14].

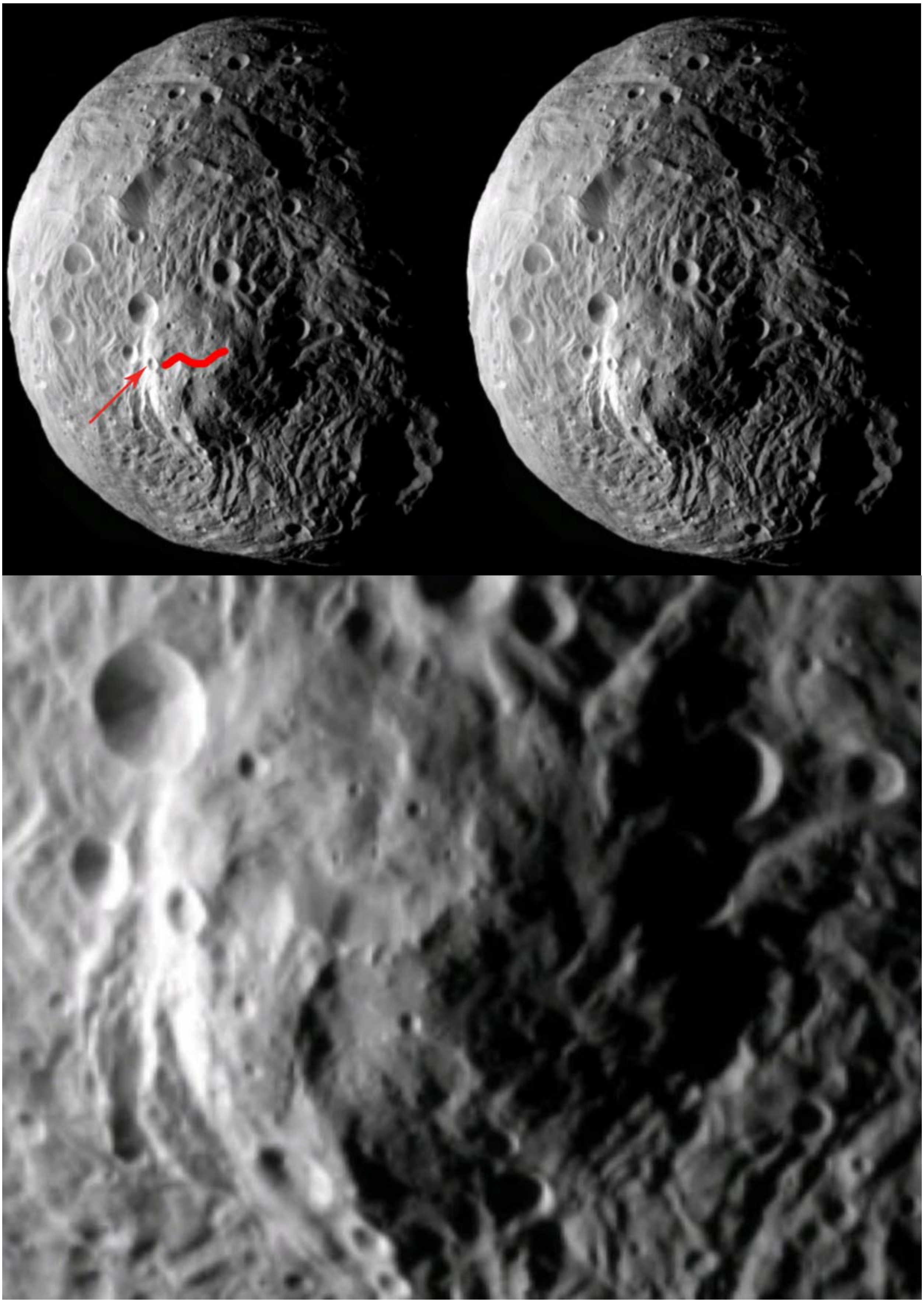

Fig. 6. Vesta, an asteroid. The central element (see Fig. 5). A convex up basin moves from left to right (at Fig. 5 from above downwards). See [1:8]. The front is flat, and there is a crater at the center of the front (the crater is pointed by arrow). A winding trough grows up from this root crater. The crater is an element of a Mississippi; see an analogous crater at Fig. 10. Image: Dawn, July 2011.

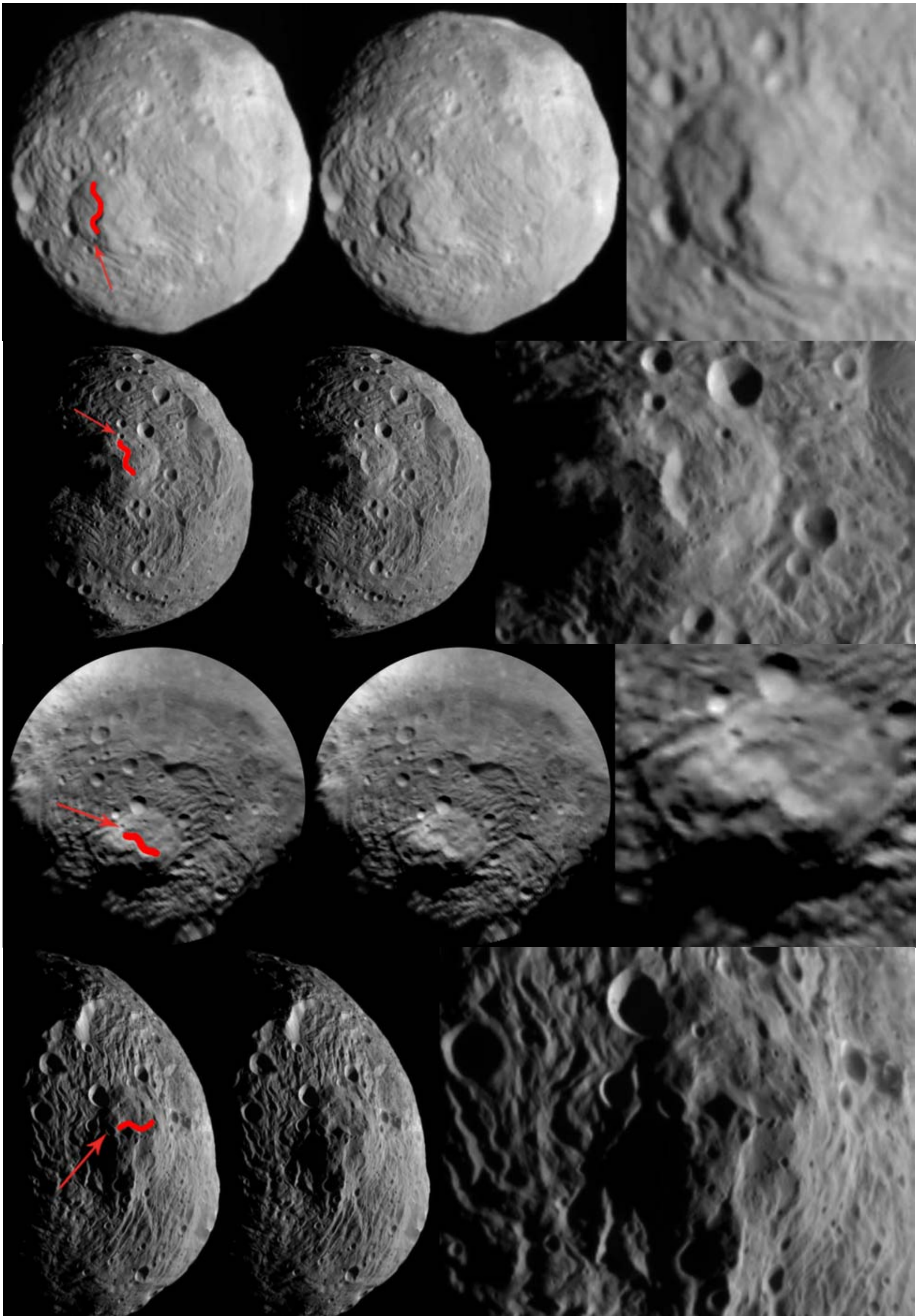

Fig. 7. The central element (Fig. 6). The root crater is pointed by the arrow. Images: Dawn, July 2011.

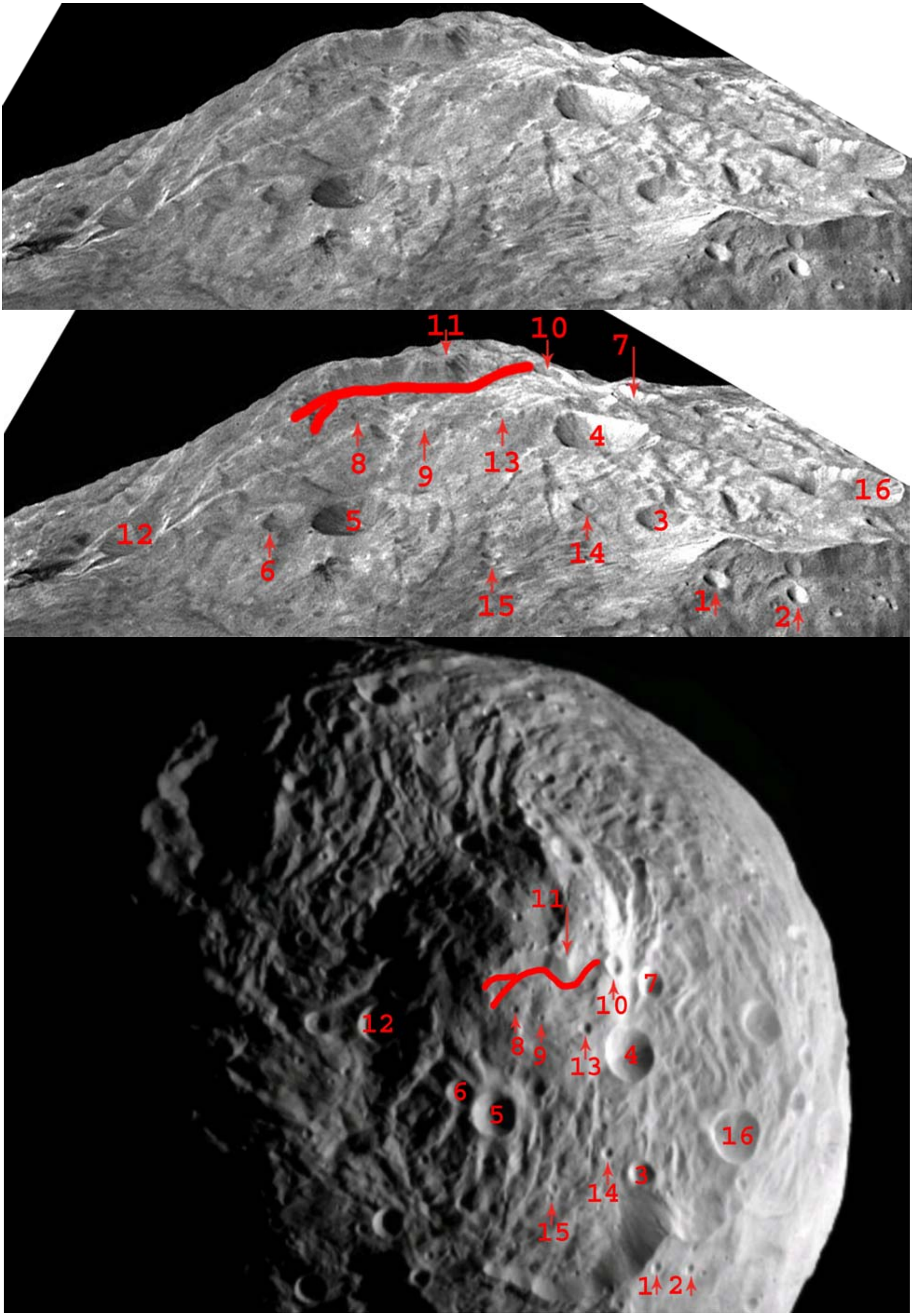

Fig. 8. The central element (Fig. 6-7). The root crater is pointed by the arrow (10). Images: Dawn, July-August 2011. **Lower:** Fig. 6, 180^0-turned.

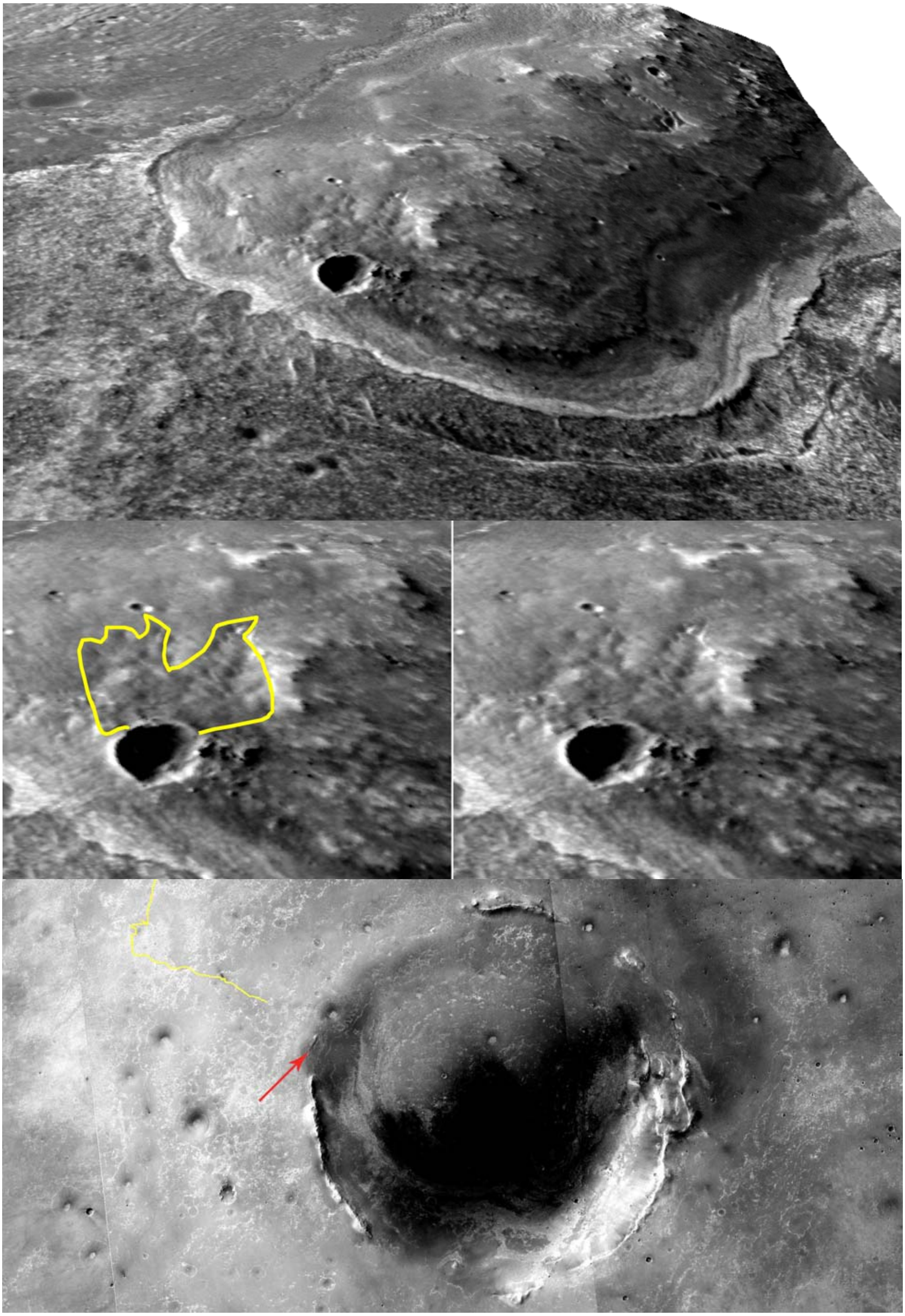

Fig. 9. Upper: Mars, PIA14134. The Odysseus crater is the central element of the Cape York hill. Cape York is a fragment of a ring range of Endeavour crater (it's diameter is 22 *km*). **Lower:** The Endeavour crater, PIA14135. Odysseus and Cape York are pointed by the arrow.

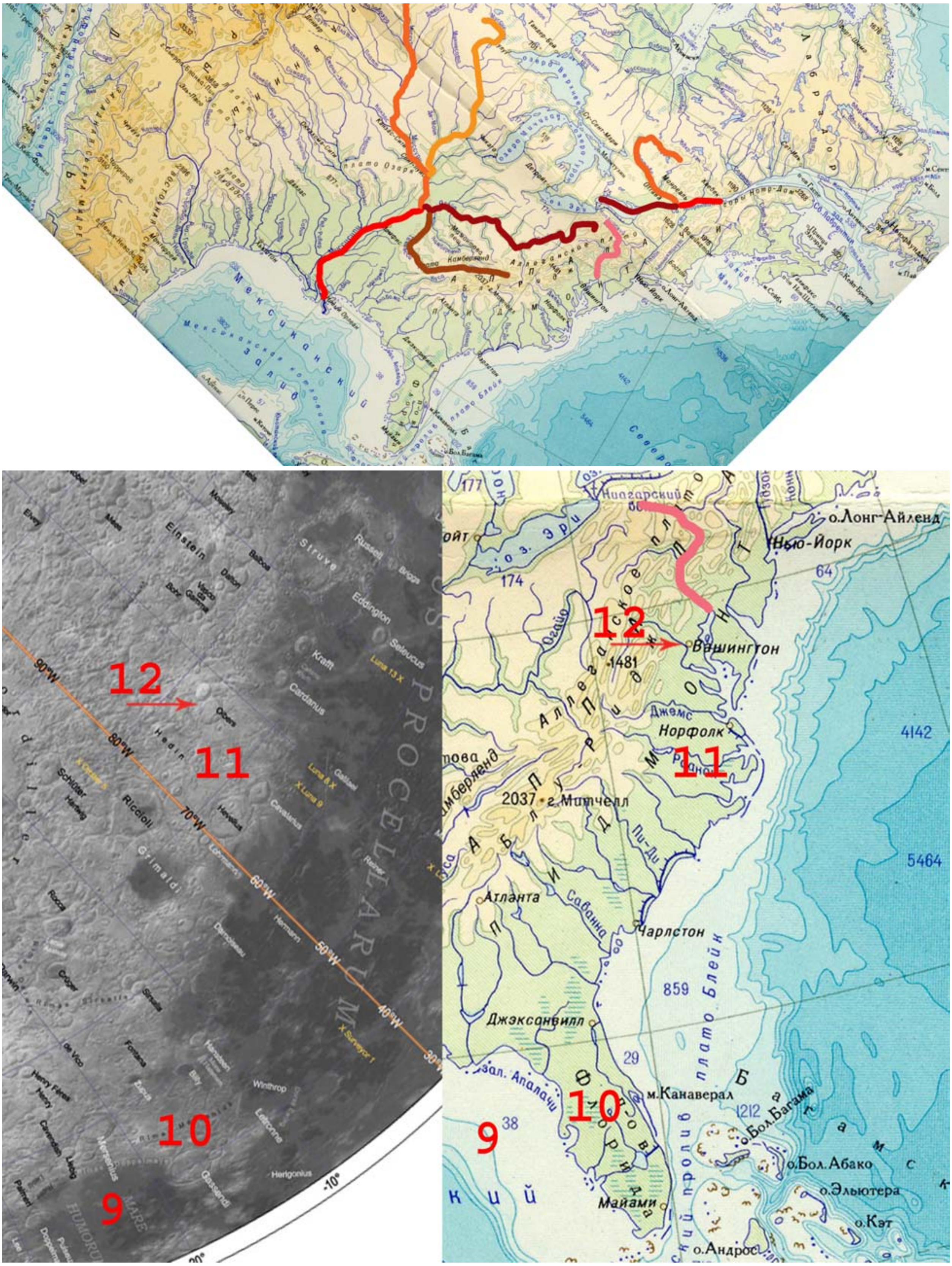

Fig. 10. Upper: By analogy with Chukotka (Fig. 3 lower) Great Lakes prolong the direction of the Susquehanna River and the Chesapeake Bay. The Chesapeake Bay + the Delaware Bay together are a local Caspian Sea. **Lower:** Atlantic coastlines of the Moon and the Earth [4, Fig. 31]. The joint of the Glushko and Olbers craters (a source of rays [4, Fig. 8, 9]) is pointed by the arrow; Washington is righter. On capitals and singular points of the Earth see [2, p. 95], [5].

Fig. 11. Upper: Two craters in Washington. **Lower:** The root crater of the Chesapeake Bay.

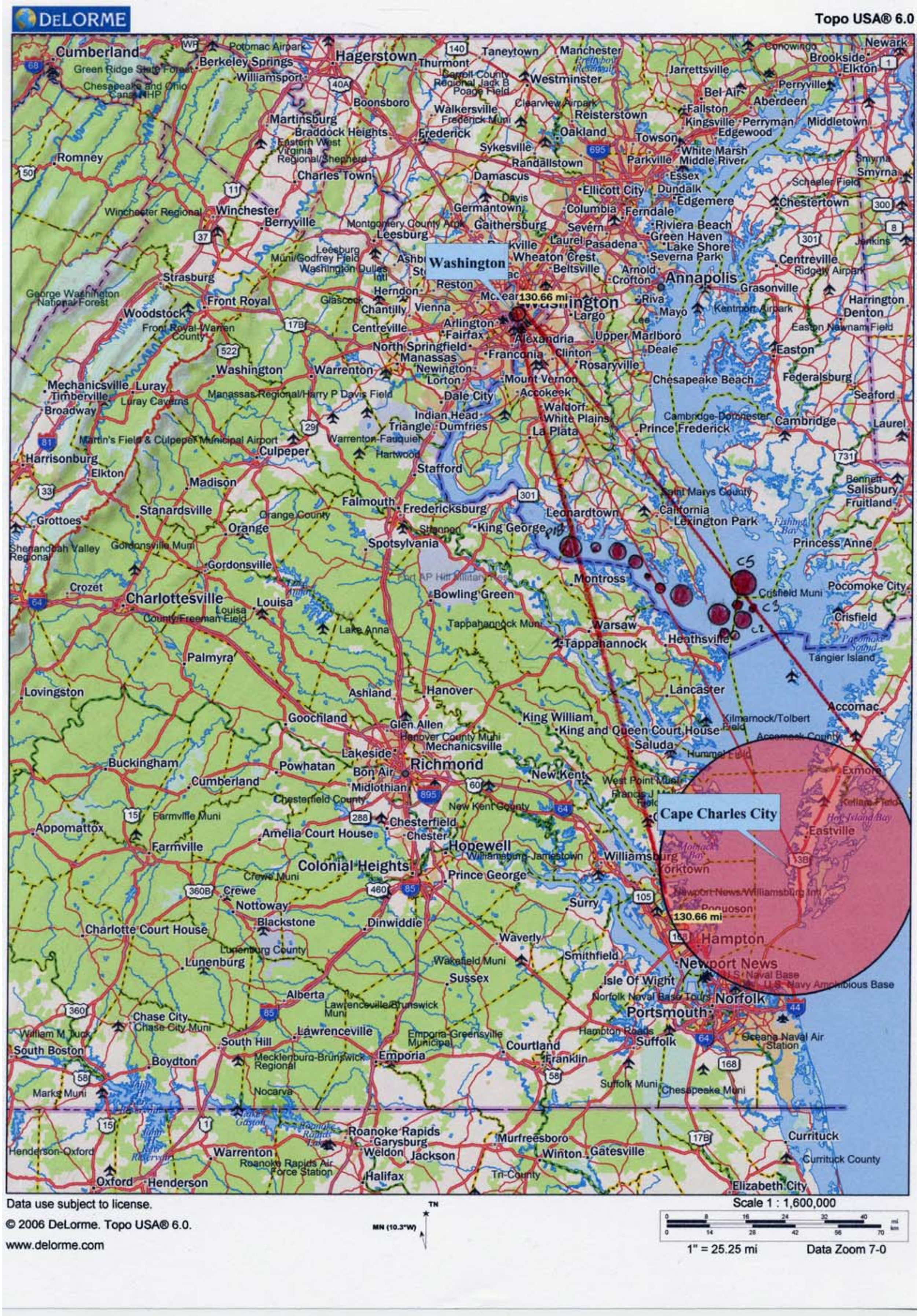

Fig. 12. The Chesapeake Bay and it's craters. The big crater is the root crater of the bay.

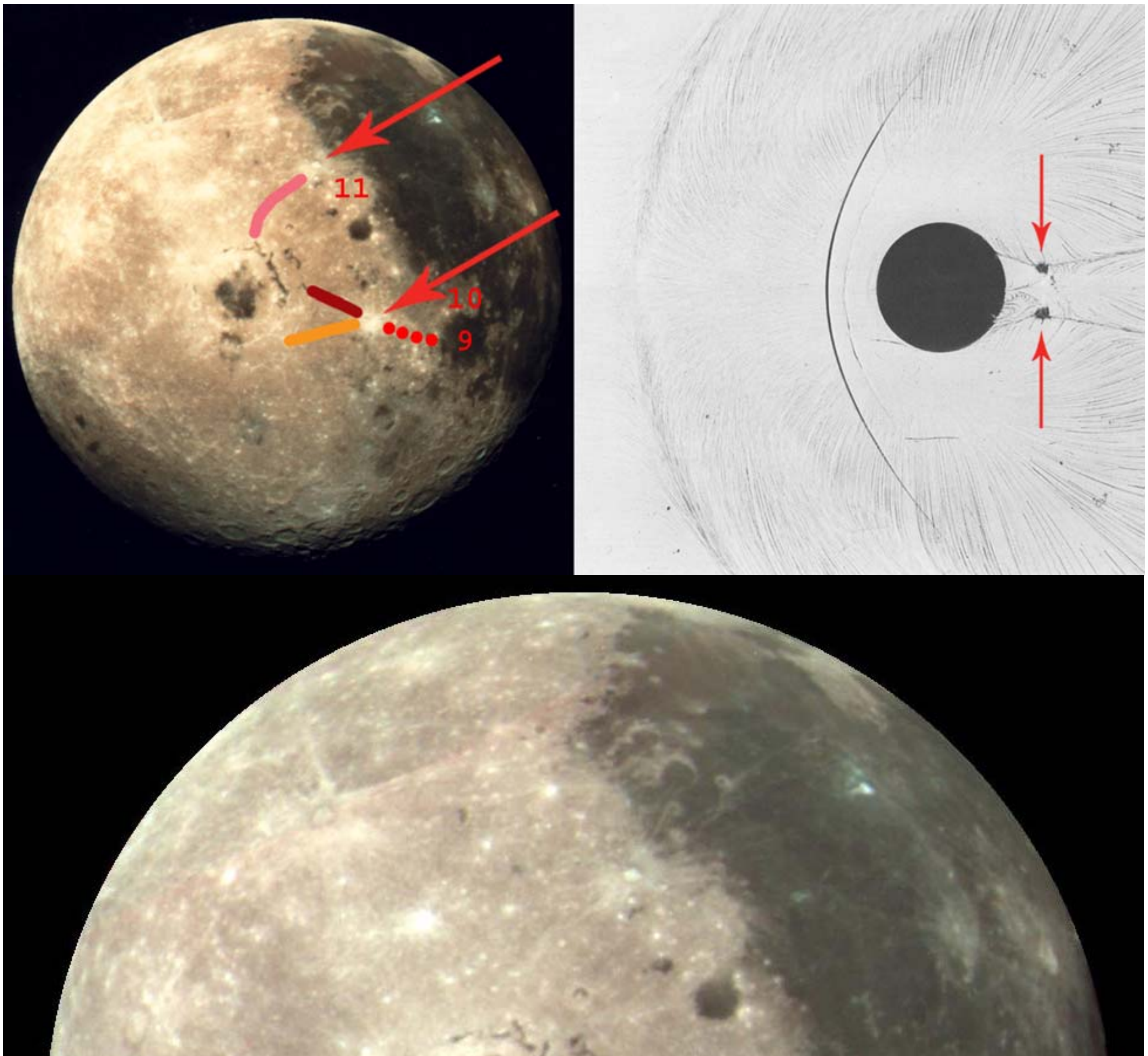

Fig. 13. The Moon. The Humorum Mississippi (see Fig. 10). The pink curve is a paired analog of the Gulf of Saint Lawrence, as far as the Chesapeake Bay. **Upper Left:** The upper arrow points the ray pair of craters Olbers-Glushko. The lower arrow points the Byrgius A ray crater. **Upper right:** The cylinder is streamlined by supersonic flow. M = 2,5, Re = 735 000. **Lower:** Image: Galileo, P-37329 (PIA00113).

9. African Mississippis

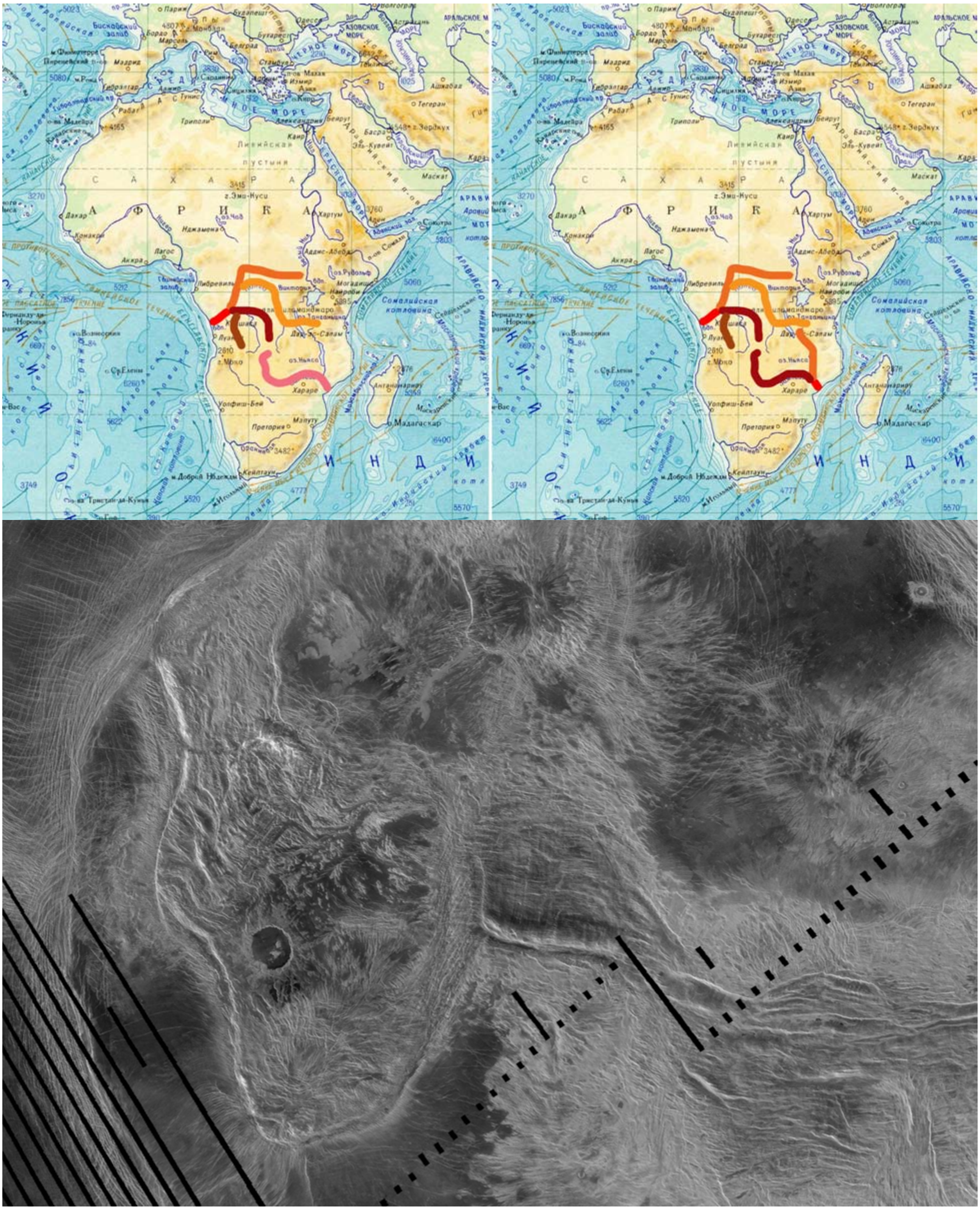

Fig. 1. Upper: The Congo River is a classical Mississippi. Yellow-orange curve is connected to Kilimanjaro, the highest point of Africa. The central element (Fig. 8.5-8.8) of the Congo + Zambezi complex is South Africa. This is the head of the flow. It generates the whole continent [1:6]. Local Caspian Sea (unidentified yet) is a natural prolongation of the central element. **Lower:** Africa in the Artemis Corona (mirrored). Venus, PIA00101.

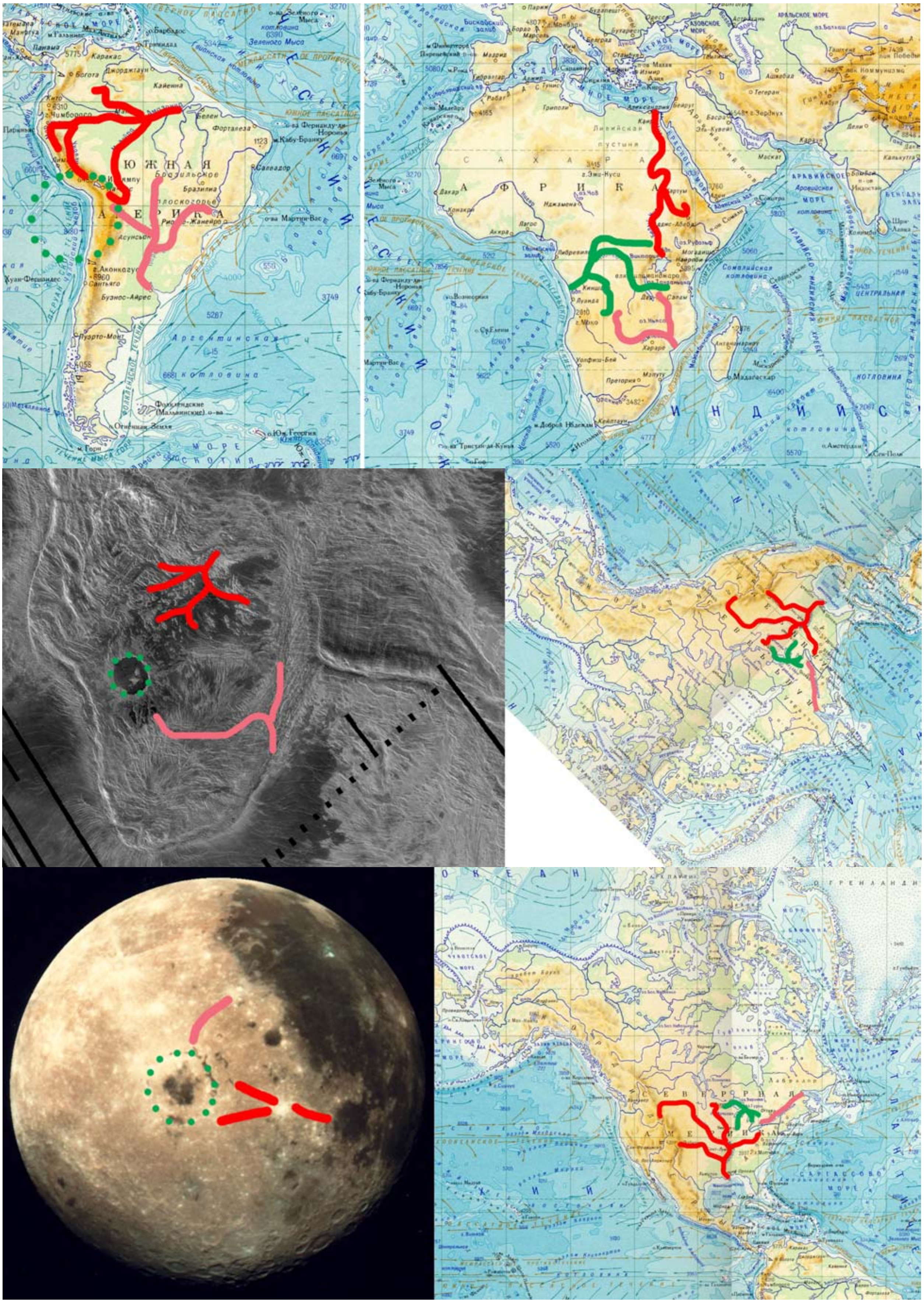

Fig. 2. Mississippis and Caspian Seas. **Lower left:** The Moon, Mare Orientale (Fig. 8.10).

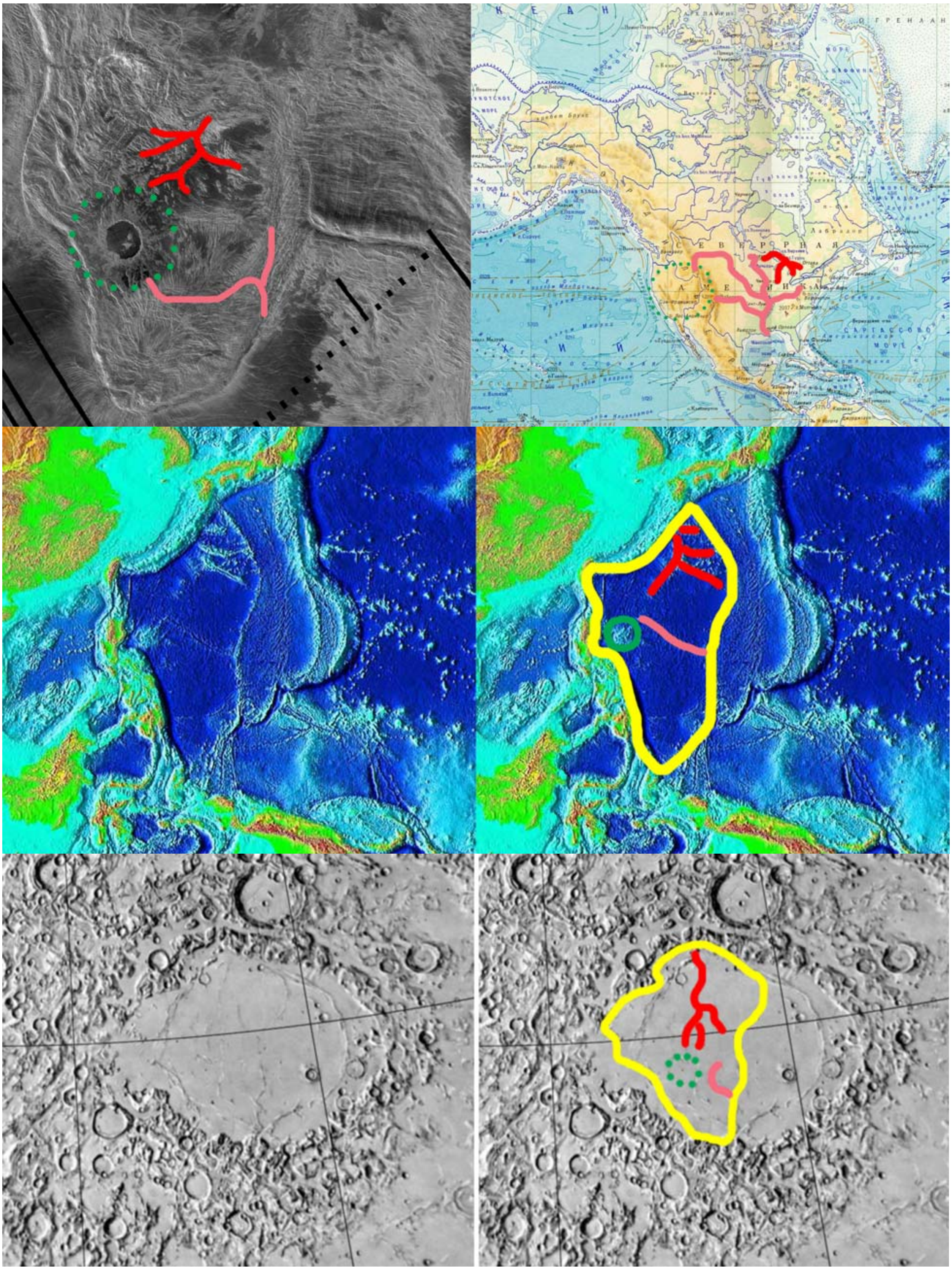

Fig. 3. Upper: Big Basins: convex down and convex up. **Center:** The Philippine Sea. A convex down Africa with a convex up Congo Basin. The convexity (front) of the Philippinian moving basin is a local Australia (Fig. 4), [1:10, Fig. 10]. **Lower:** An Africa in Mare Crisium (mirrored), the Moon. This Africa is an element of a moving basin (center, lower). The Africas have foregoing whiskers, they are expanded to South from the “Southern” head component.

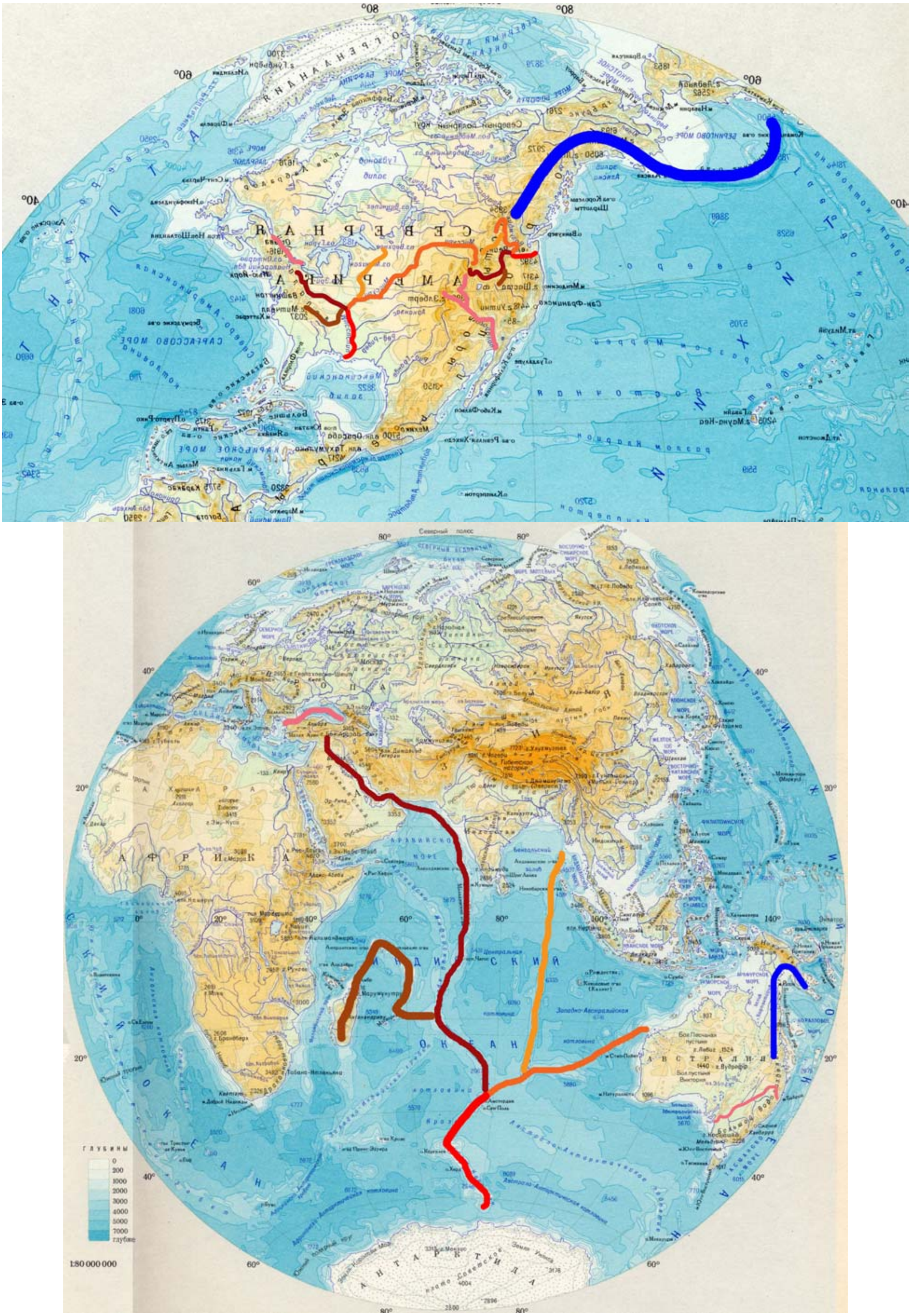

Fig. 4. Australia and the Big Basin are convex up Caspian Seas (Fig. 2.3, 3.1-3.3, 6.6-6.8).

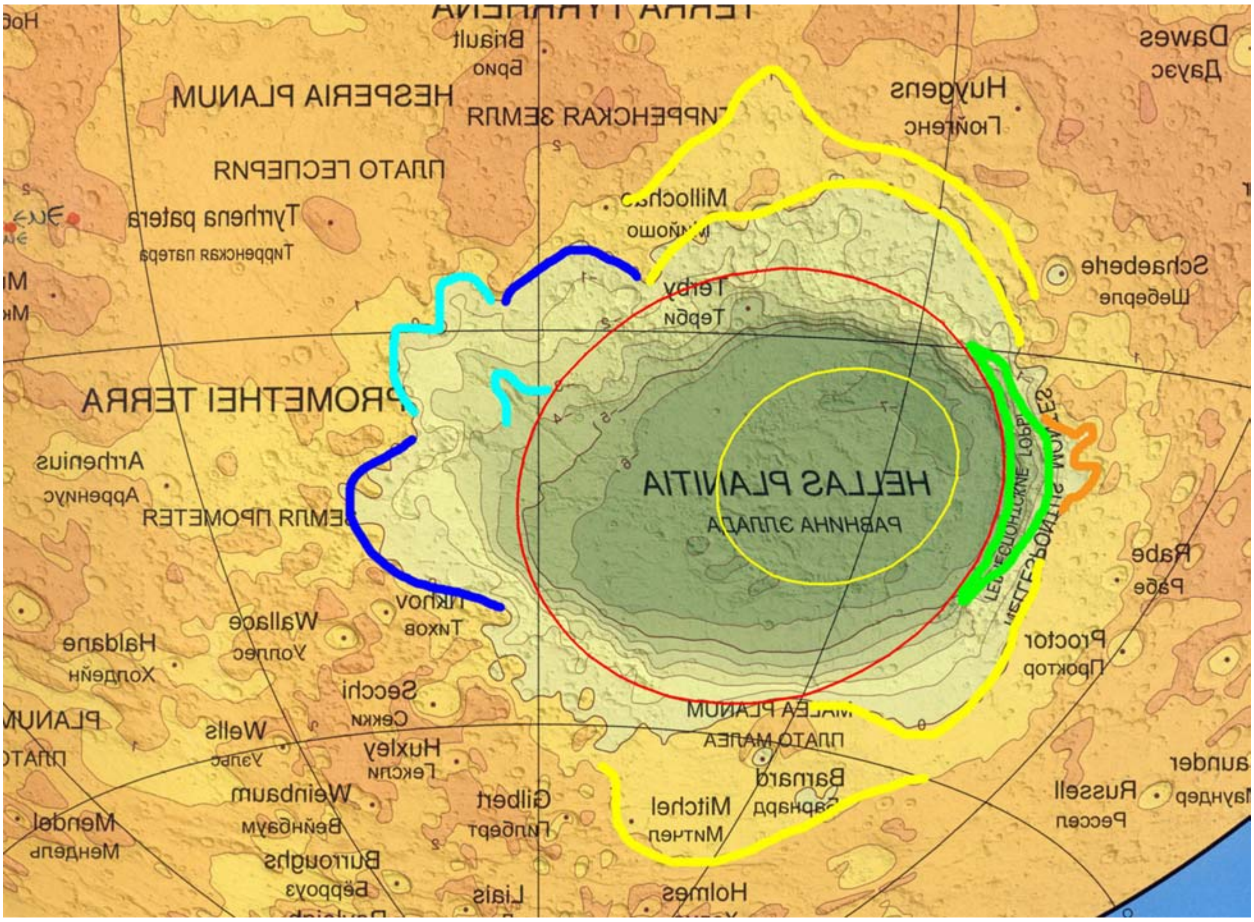

Fig. 5. Mars (mirrored). Hellas Planitia is a convex down analog of South America. The foregoing area is a Big Basin. Whiskers are a San Francisco region (Fig. 3-4).

10. World Oceans

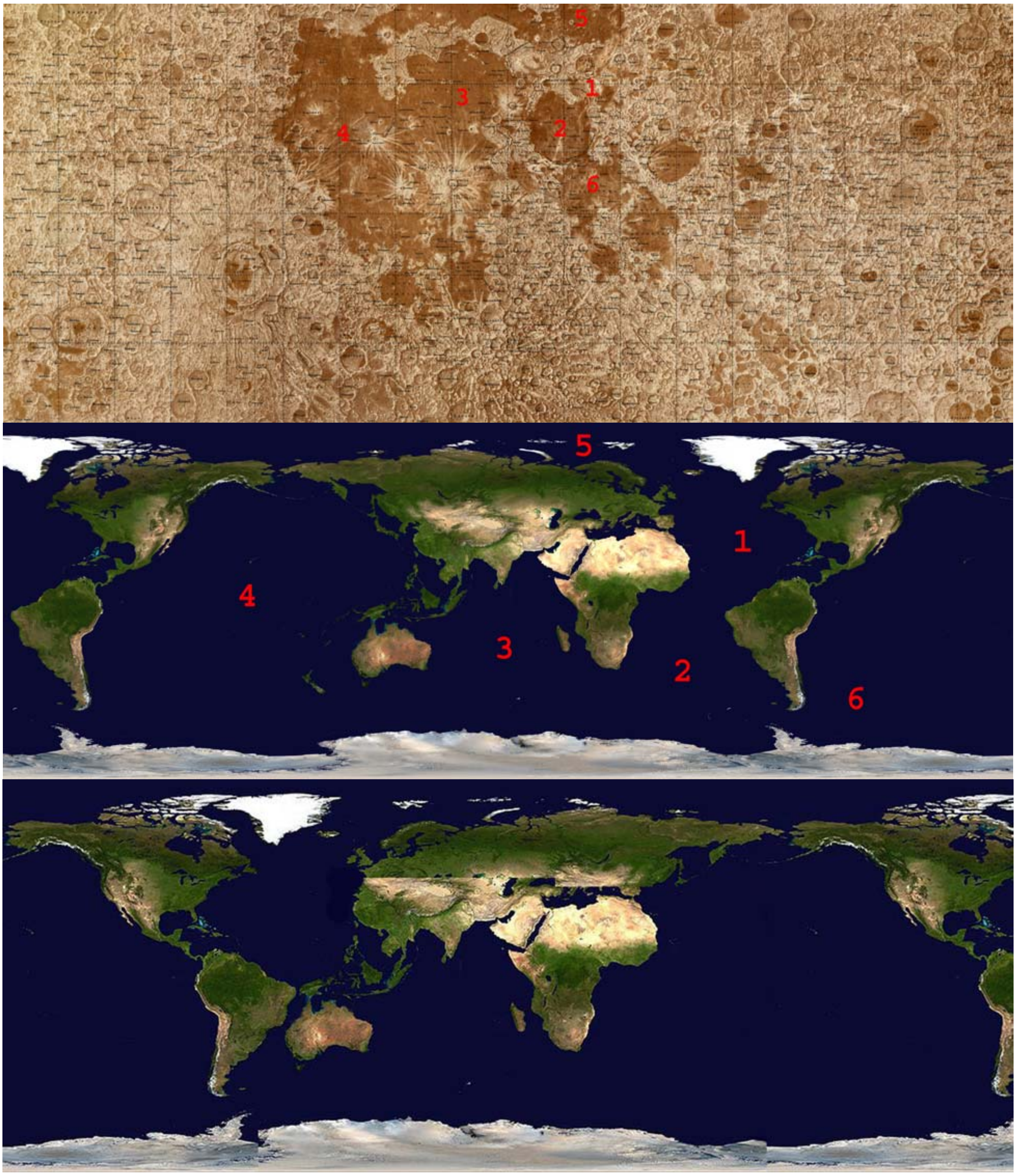

Fig. 1. Developing of lunar theme [4, Fig. 29]. **Upper:** The Moon. The element 1 is a head of local Antarctida 1+2. Further, 1 is a beginning of the Karman vortex street 1+2+3+4 [4, Fig. 23]. The element 5 is a long shock wave, it connects the head 1 to the ocean 4. **Center:** The Atlantic is an Antarctida (Fig. 1.4). Respectively, the Atlantic is a head of the World Ocean, i.e. of a Karman vortex street. Recall that South America is a head of the continental Karman vortex street (see Section 1, [1:1], [1:21]). Also the Atlantic can be considered as a prolongation of the Mediterranean Sea. **Lower:** [4, Fig. 29]. We take into account that lunar North America isn't mirrored. There is the Mediterranean Sea instead of lunar Antarctida 1+2. The element 6 is the Black Sea. The direction of moving of the Aral Sea [1:8, Fig. 4] corresponds to the direction of moving of Mare Crisium [4, Fig. 17-18].

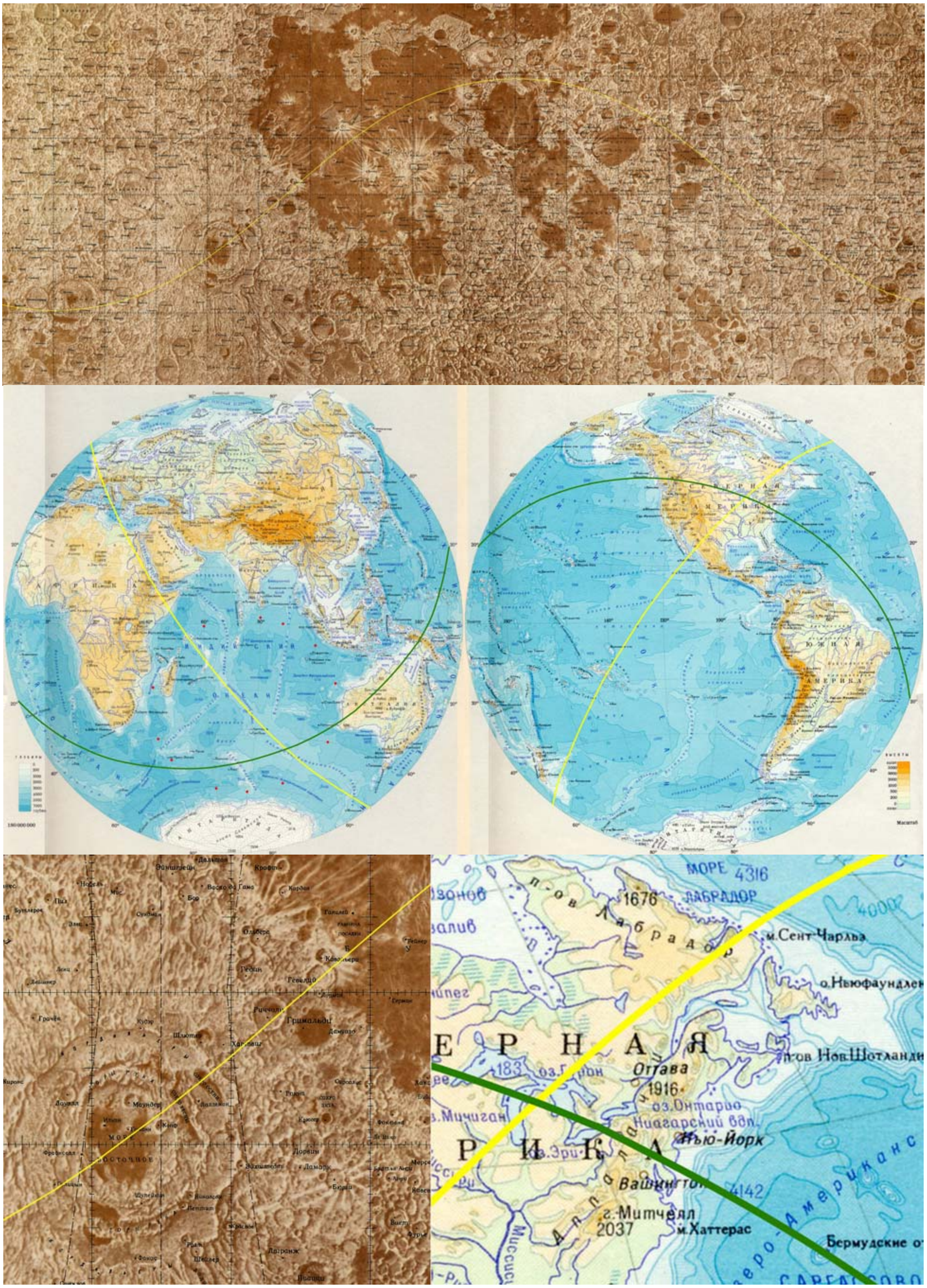

Fig. 2. Upper: The Moon. The straight line connects centers of Mare Orientale (19.47^0 S, 94.82^0 W) and Mare Imbrium (33.25^0 N, 15.82^0 W). It goes also through the head of the element 1 (Fig. 1 upper). **Center:** The yellow straight line connects centers of Great Lakes (43.80^0 N, 82.94^0 W) and the Indian Ocean (30^0 S, 75.13^0 E). It goes also through the center of the Mediterranean Sea. The green straight line connects the center of Great Lakes and the highest point of the Bermudas (the head of the Atlantic) (32.14^0 N, 64.74^0 W). **Lower:** Grimaldi, a lunar crater, corresponds to the Gulf of Saint Lawrence (yellow line) as far as to the Chesapeake Bay (green line).

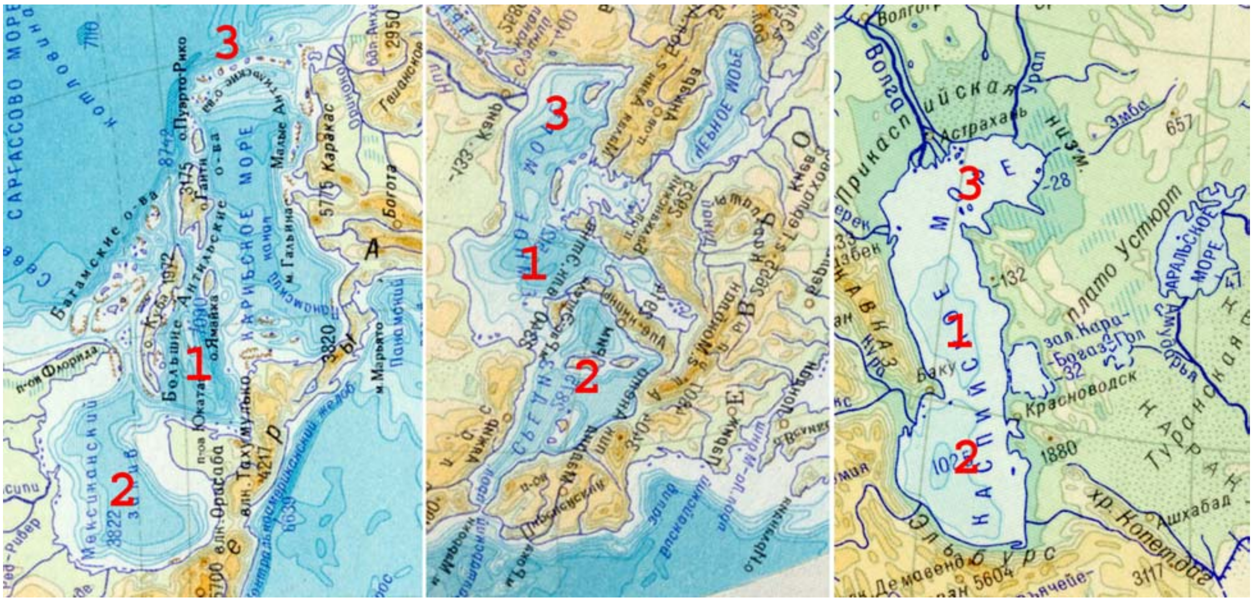

Fig. 3. By Fig. 1-2, the Mediterranean Sea is an Antarctida: 1 is a head of the flow, 2 is a body, 3 is a "long shock wave". It is true for the Caspian Sea too. **Left:** Caribbean Antarctida is an example of a classical Antarctidalike flow.

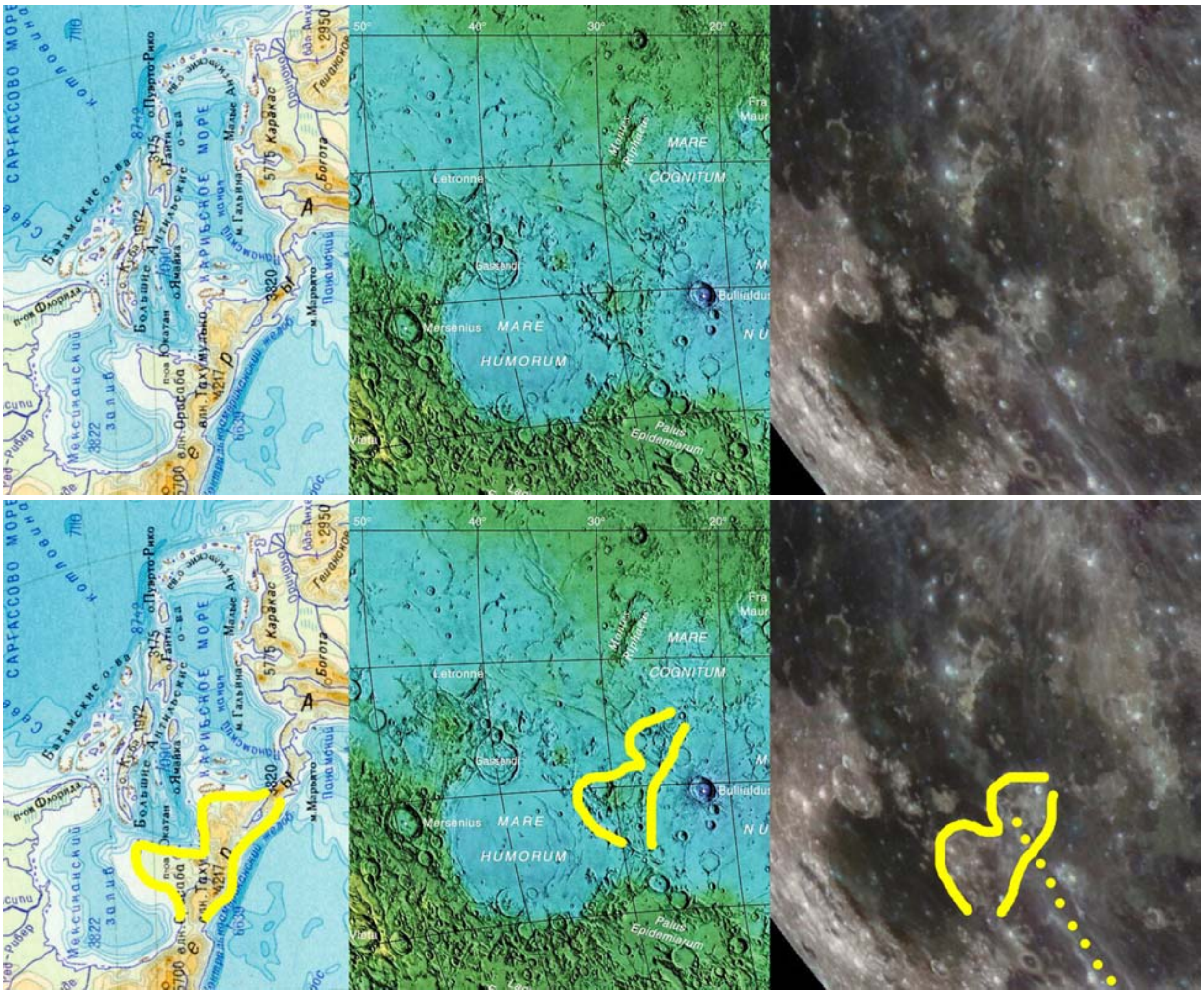

Fig. 4. Lunar Mare Humorum is a copy of Caribbean Antarctida. See [4, Fig. 29]. The pointed line marks the ray of Tycho crater. **Left:** Caribbean Antarctida. **Center:** Mare Humorum. Map of USGS. **Right:** Mare Humorum. Galileo, PIA00405.

Fig. 5. An analog of Fig. 4. The yellow pointed line is an analog of the ray of Tycho Crater.

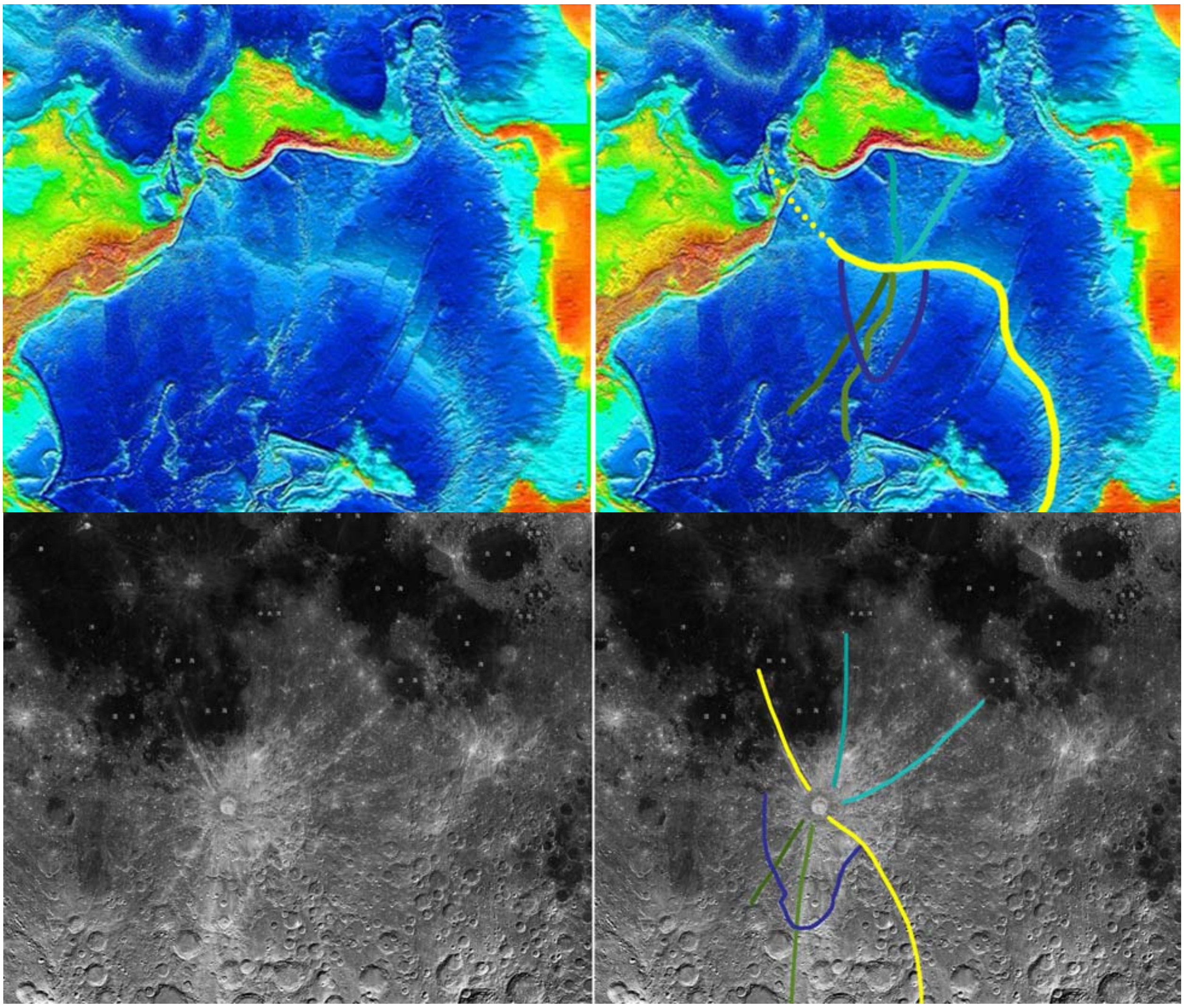

Fig. 6. Upper: Tycho Crater in the Pacific Ocean. **Lower:** Tycho Crater on the Moon. Chinese map of the Moon.

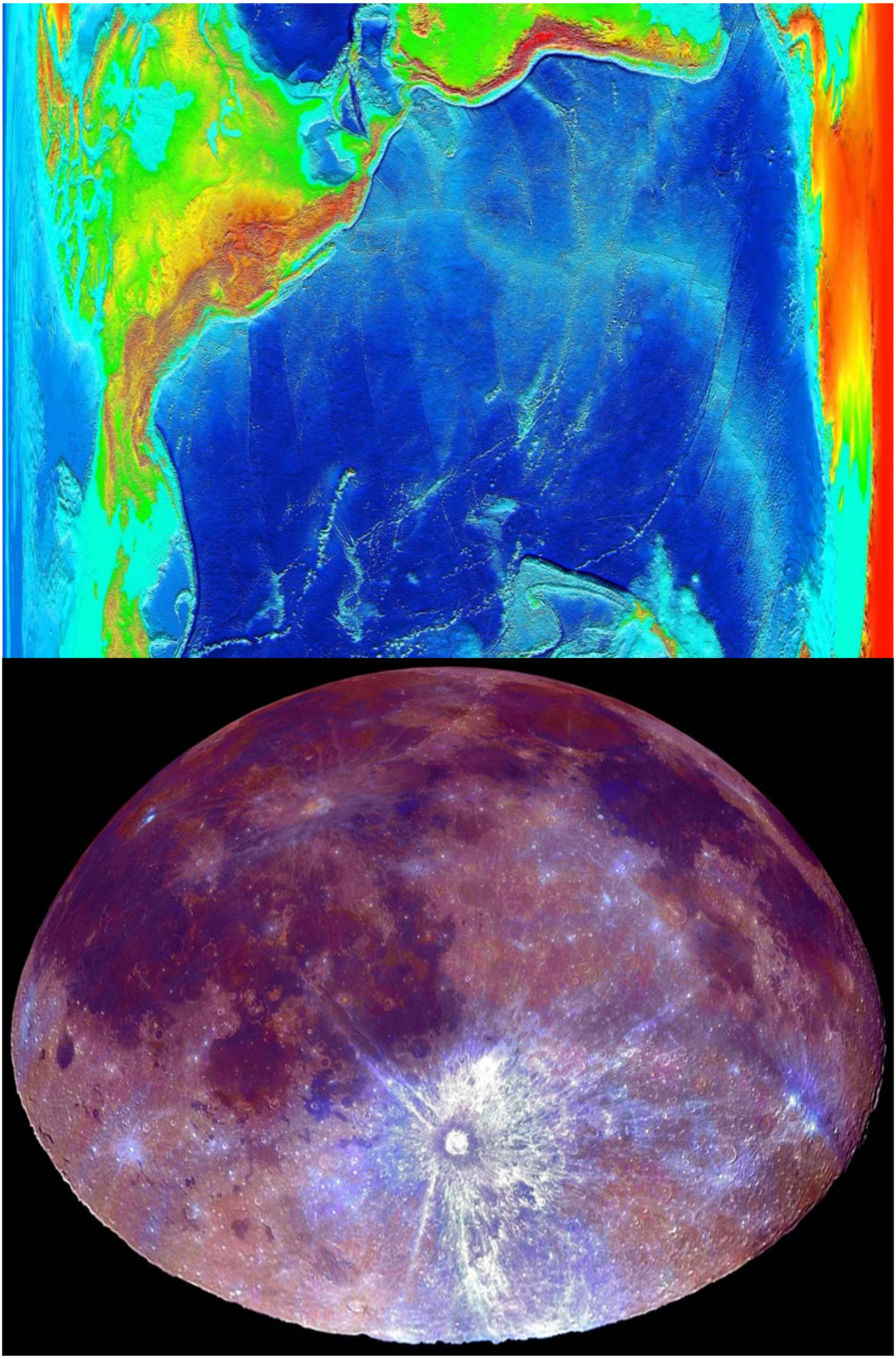

Fig. 7. Tycho Butterflies. **Lower:** Image from **http://www.lpod.org/?p=258** .

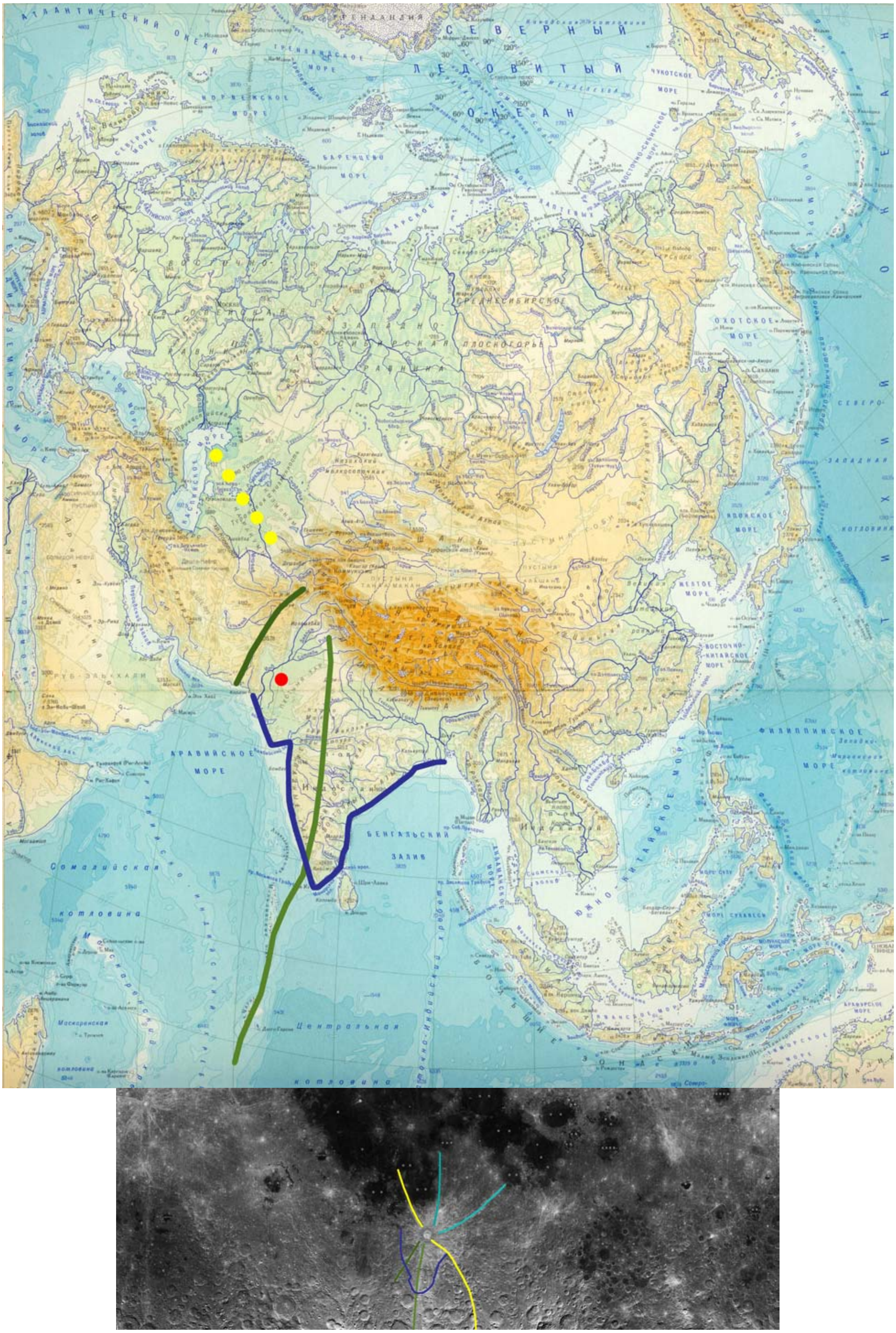

Fig. 8. The Pamir Mountains are an analog of Tycho Crater. The yellow pointed line is a hypothetical ray of Tycho Crater (Fig. 5 right). The red point is antipodal to Easter Island (ostrov Paskhi). **Lower:** Tycho Crater on the Moon.

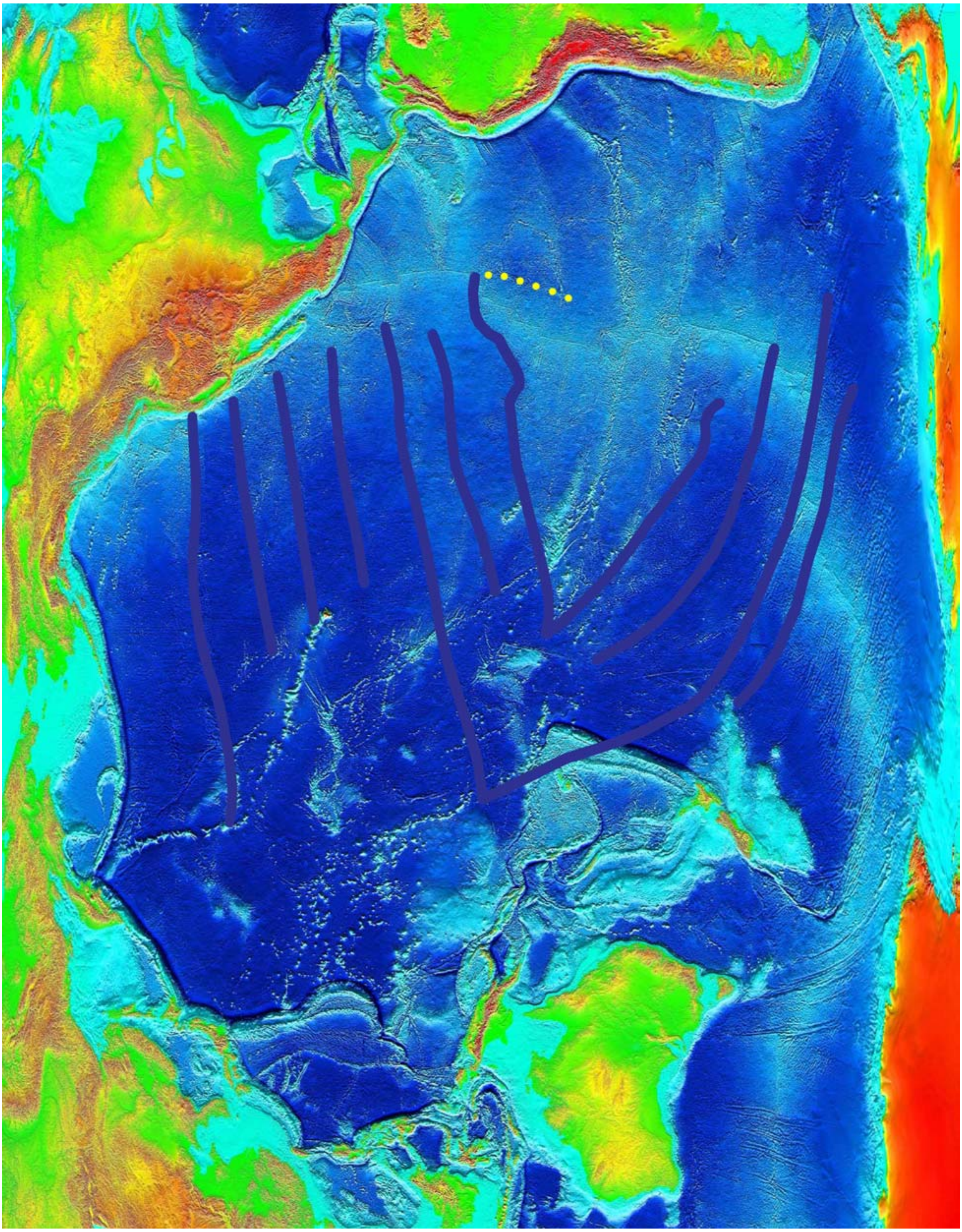

Fig. 9. Family of waves of the Pacific Tycho Batterfly. The notch of the first wave is analogous to Indian one (Fig. 8). The yellow pointed line shows a weakly visualized range.

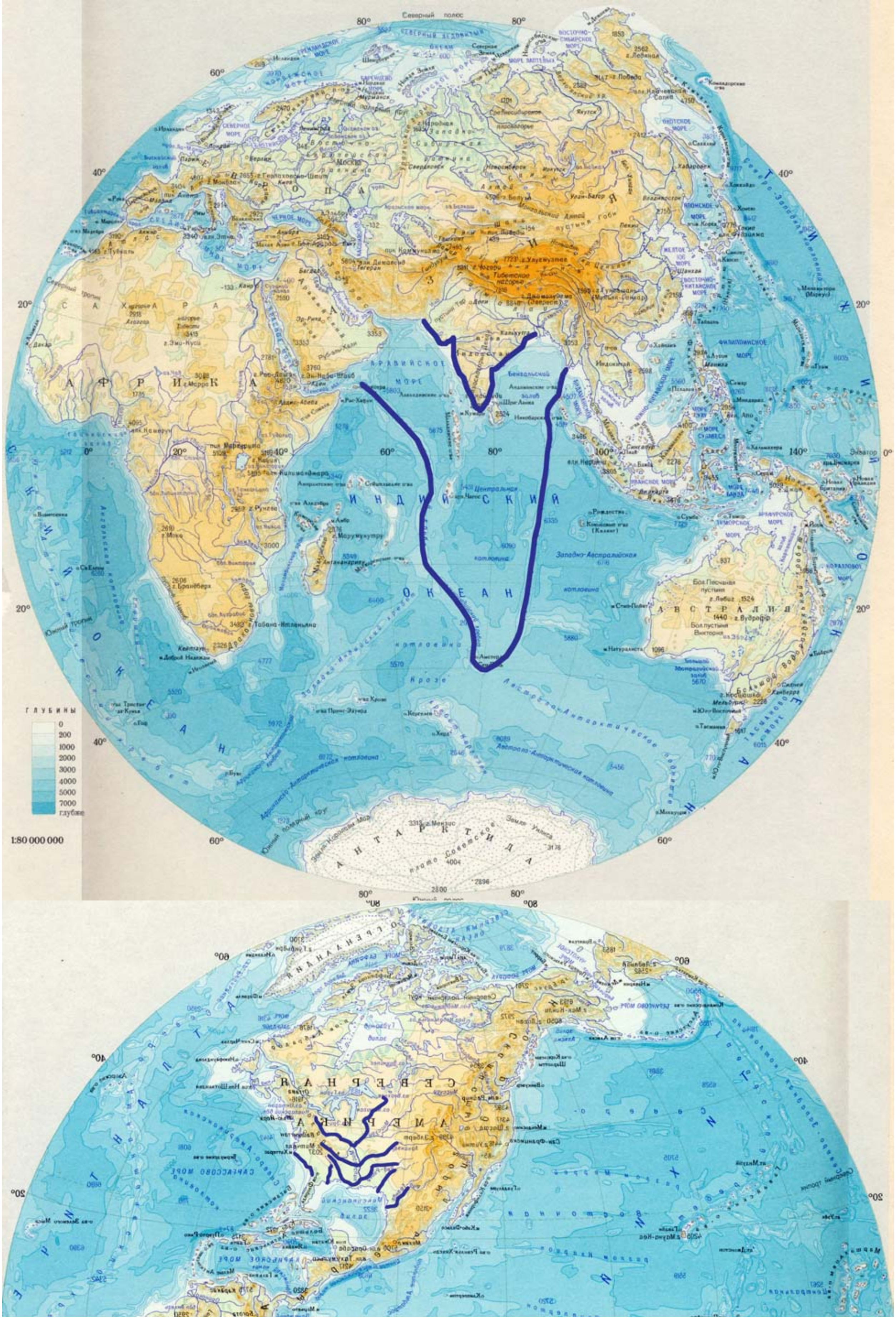

Fig. 10. Families of waves. See [1:10, Fig. 10].

Fig. 11. A family of waves of the Caspian Sea. Therefore, American Great Lakes (Fig. 10) in Eurasia forks to the Caspian Sea and to the Hymalayas.

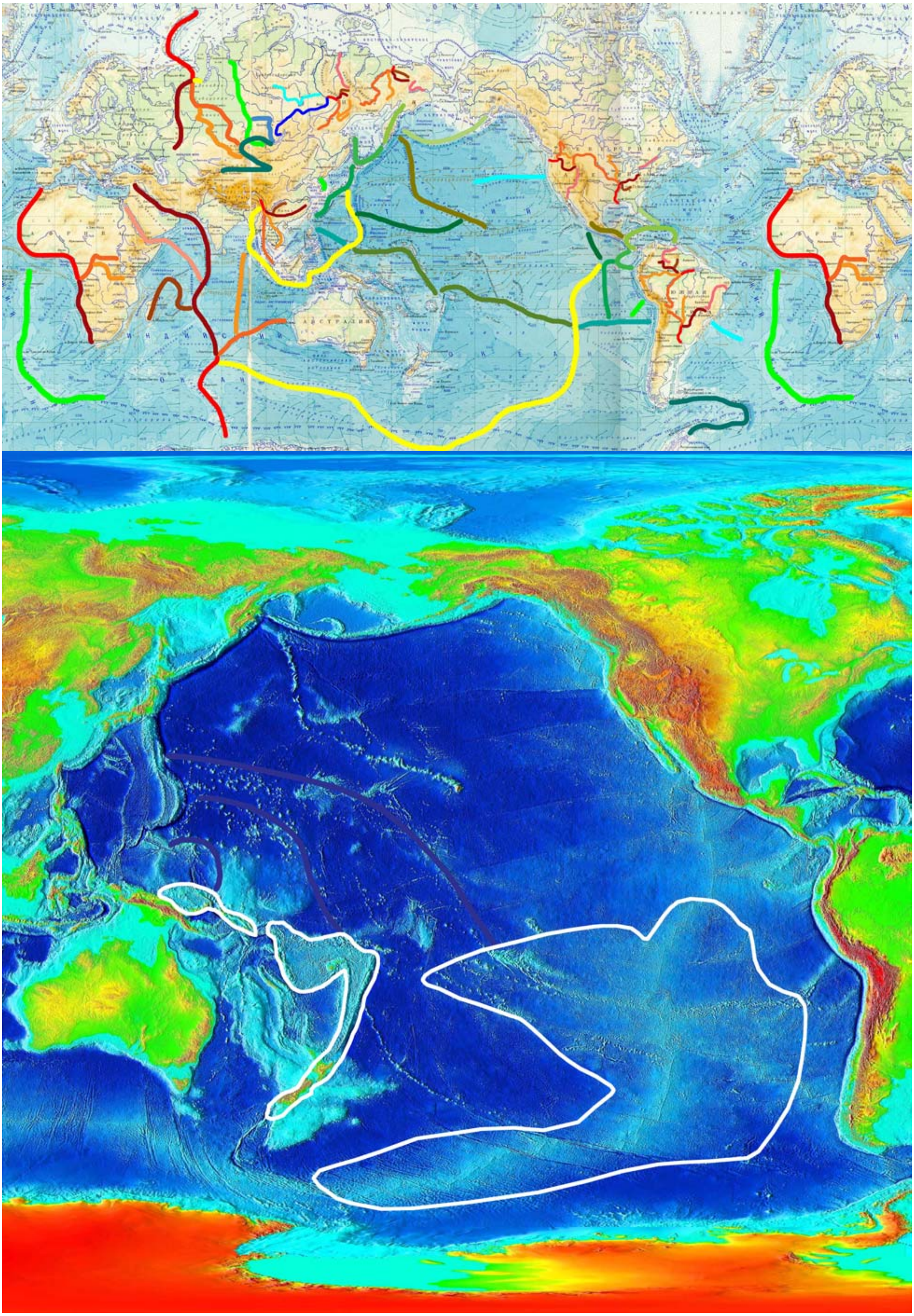

Fig. 12. Upper: Easter Island's "Tycho Crater" has it's Philippinian analog [this:7, Fig. 11 upper]. **Lower:** A family of waves of Philippinian "Tycho Crater". The white color is used for selecting of sequential objects, attached to these shock waves: Antarctida (Fig. 10), America (Fig. 13), Eurasia (Fig. 8). This is the local Philippinian "world system of continents".

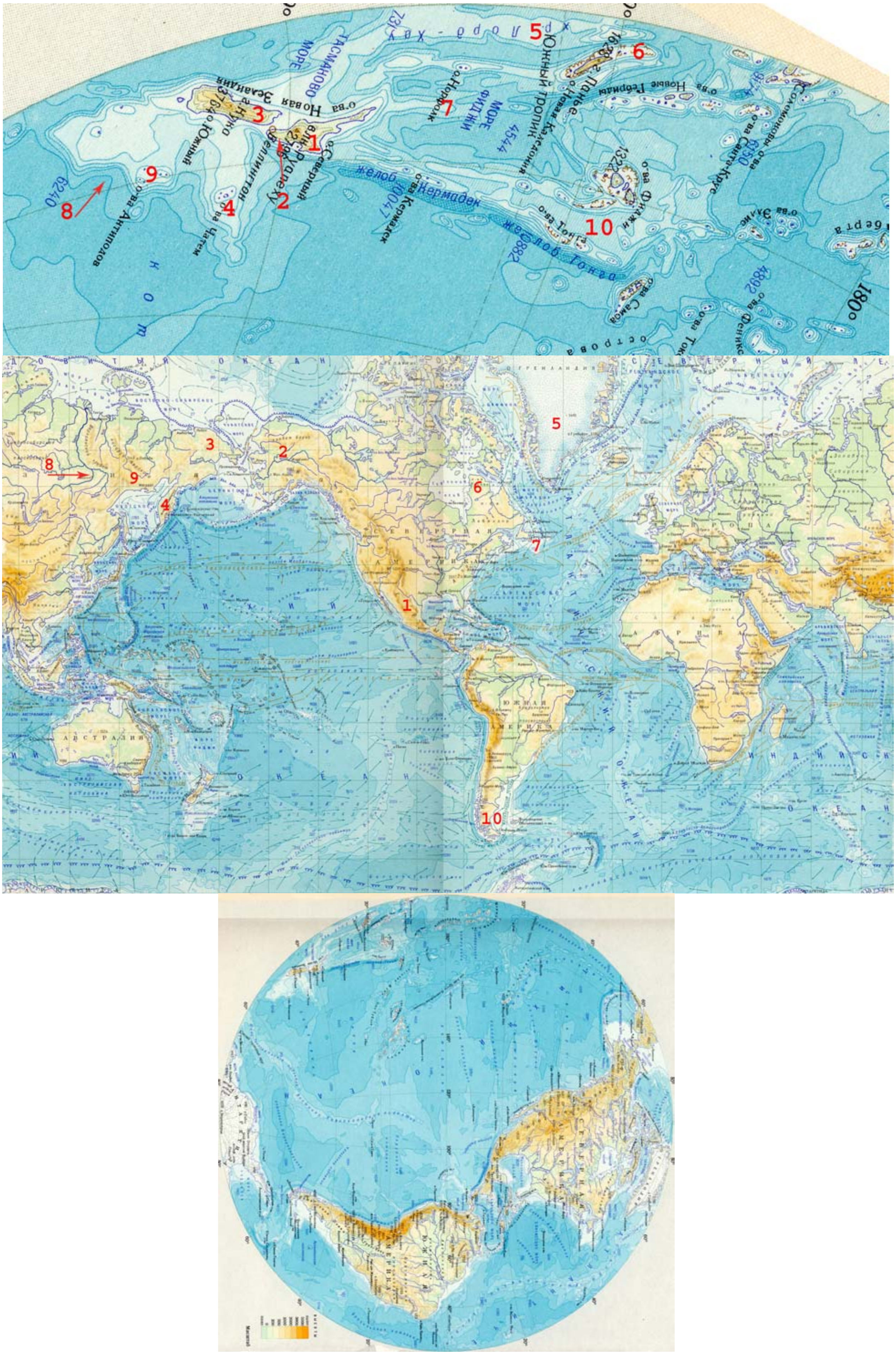

Fig. 13. This is an illustration to Fig. 12. New Zealand with it's neighborhood has a structure of America.

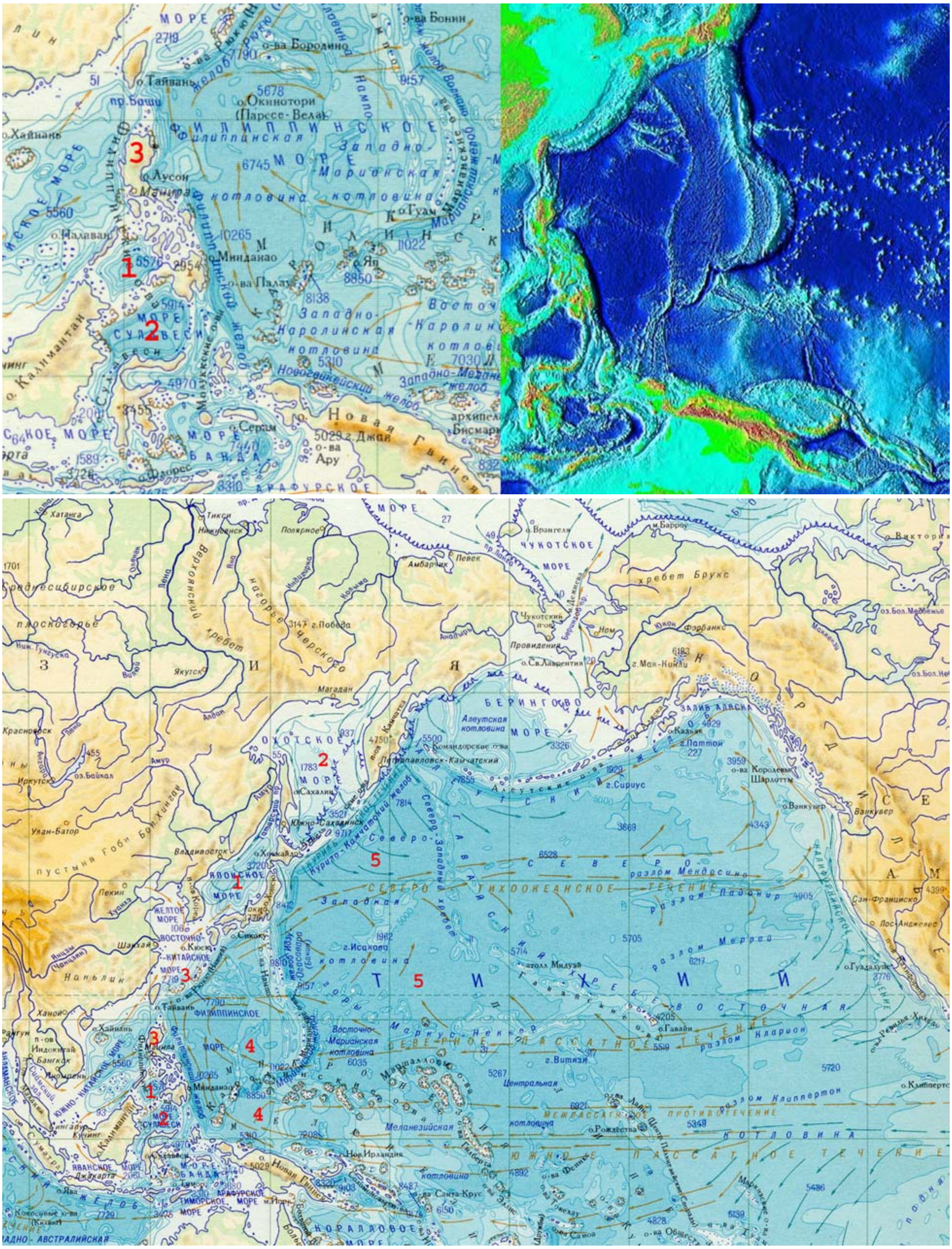

Fig. 14. The Philippinian World Ocean. **Upper left:** The Philippinian Atlantic (Fig. 12) is a classical Antarctida. It is similar to Caribbean Antarctida (Fig. 3; [1:10, Fig. 5-7]): 1 is a head, 2 is a body, 3 is a long shock wave. As the local Atlantic is oriented with respect to local Africa [this:9, Fig. 3], as the Atlantic (Atlantic Antarctida, see Fig. 1.4) is oriented with respect to Africa. **Upper right:** Local Antarctida (Fig. 12) and it's classical Mississippi [1:10, Fig. 10] in the local Indian Ocean between local Africa and local Australia. **Lower:** Japan-Okhotsk Antarctida (Fig. 5.6) is the local Arctic. It is properly oriented, it is connected to the local Atlantic by the long shock wave 3, and it's body is connected to the local Pacific 5 (Fig. 12 lower). 4 is the local Indian Ocean.

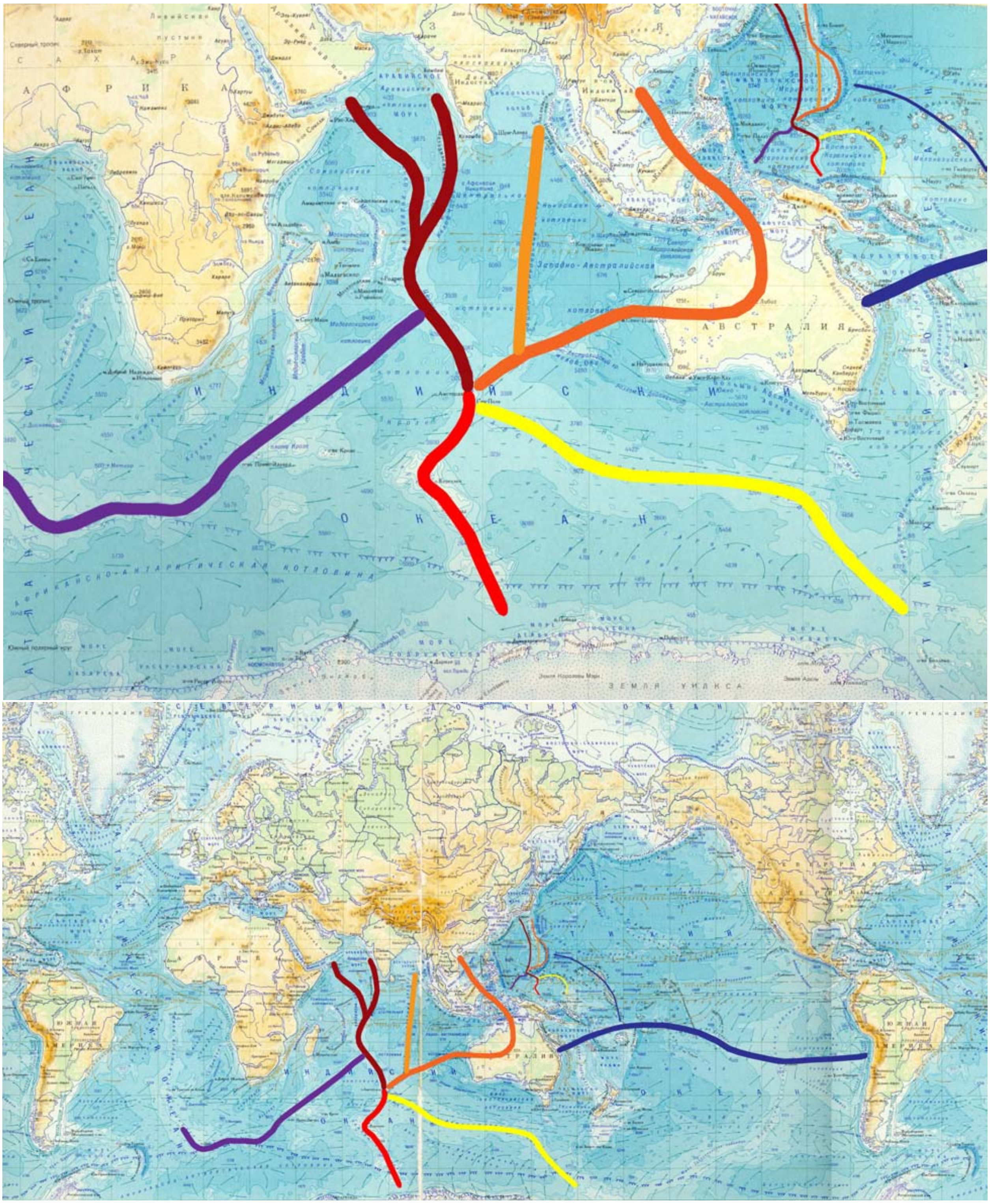

Fig. 15. The correspondence of ranges of the Indian Ocean and the Philippinian Indian Ocean, by Fig. 12. Philippinian Tycho Crater (Fig. 12) is a node (Y-node) of the local Mississippi, growing up “from buttocks” of local Antarctida. This property (a node is a Tycho Crater) is true not only for this Mississippi, see Fig. 10. The term *node* is used here in a generalized sense, because “Tycho Craters” (especially big “craters”) aren’t pointwise [1:14, Fig. 7-8], they have rather complex structure.

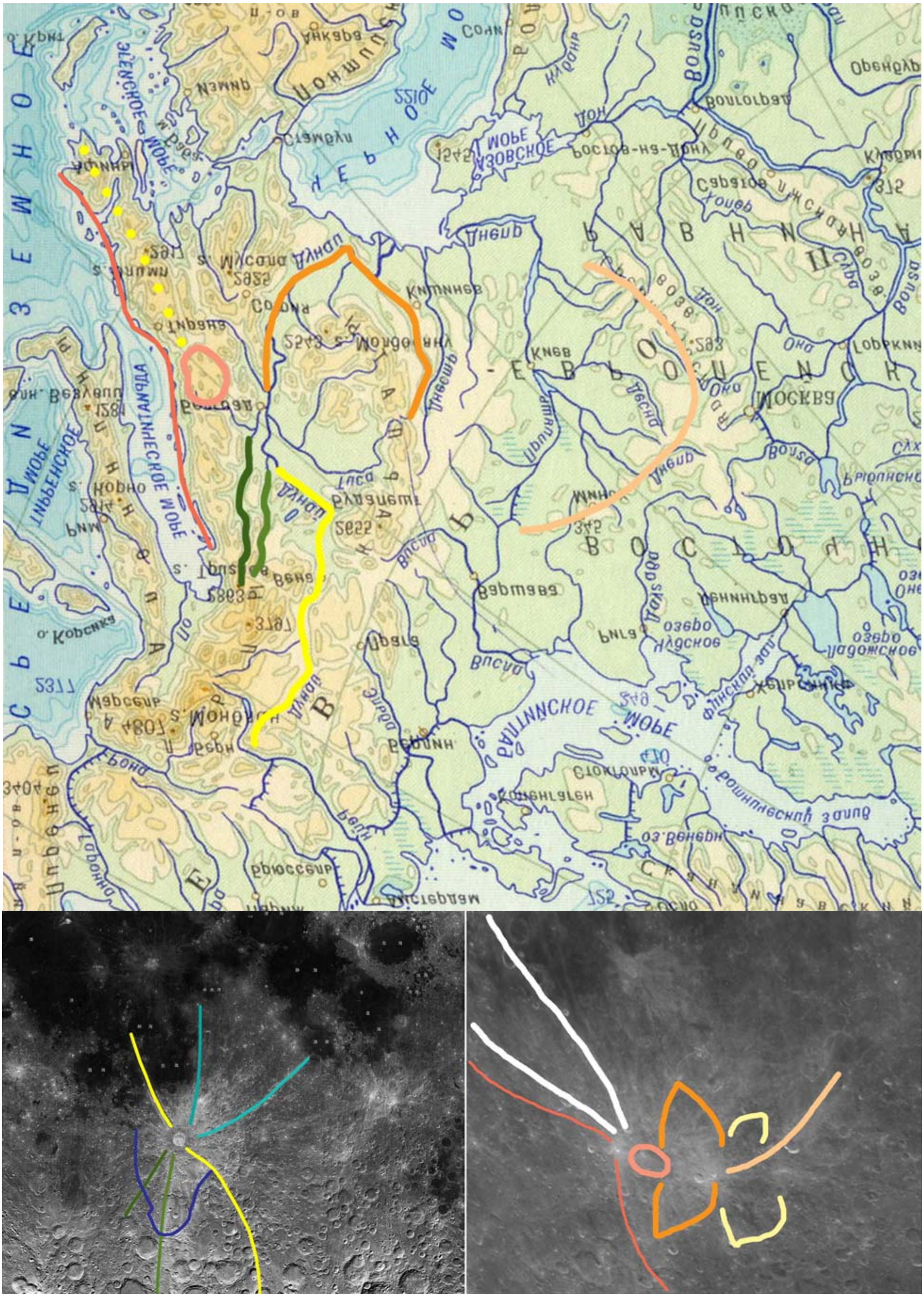

Fig. 16. Upper: The Balkan Tycho Butterfly (mirrored), by Fig. 5. **Lower left:** A fragment of Fig. 6. The Moon. Tycho (center) and Stevinus (right, at the tail of the Tycho Butterfly), ray craters. **Lower right:** [4, Fig. 21]. The Stevinus Butterfly is an analog of the Tycho Butterfly.

Fig. 17. The Balkan Tycho Butterfly (mirrored). The 2-nd and the 3-rd orange waves are attached to their Kamchatkas: the 2-nd one is attached to Ob Kamchatka [1:15, Fig. 6], the 3-rd one is attached to Kamchatka and to Malaccian Kamchatka [1:5, Fig. 4]. Africa in the 2-nd wave corresponds to Malacca in the 3-rd wave (Fig. 18).

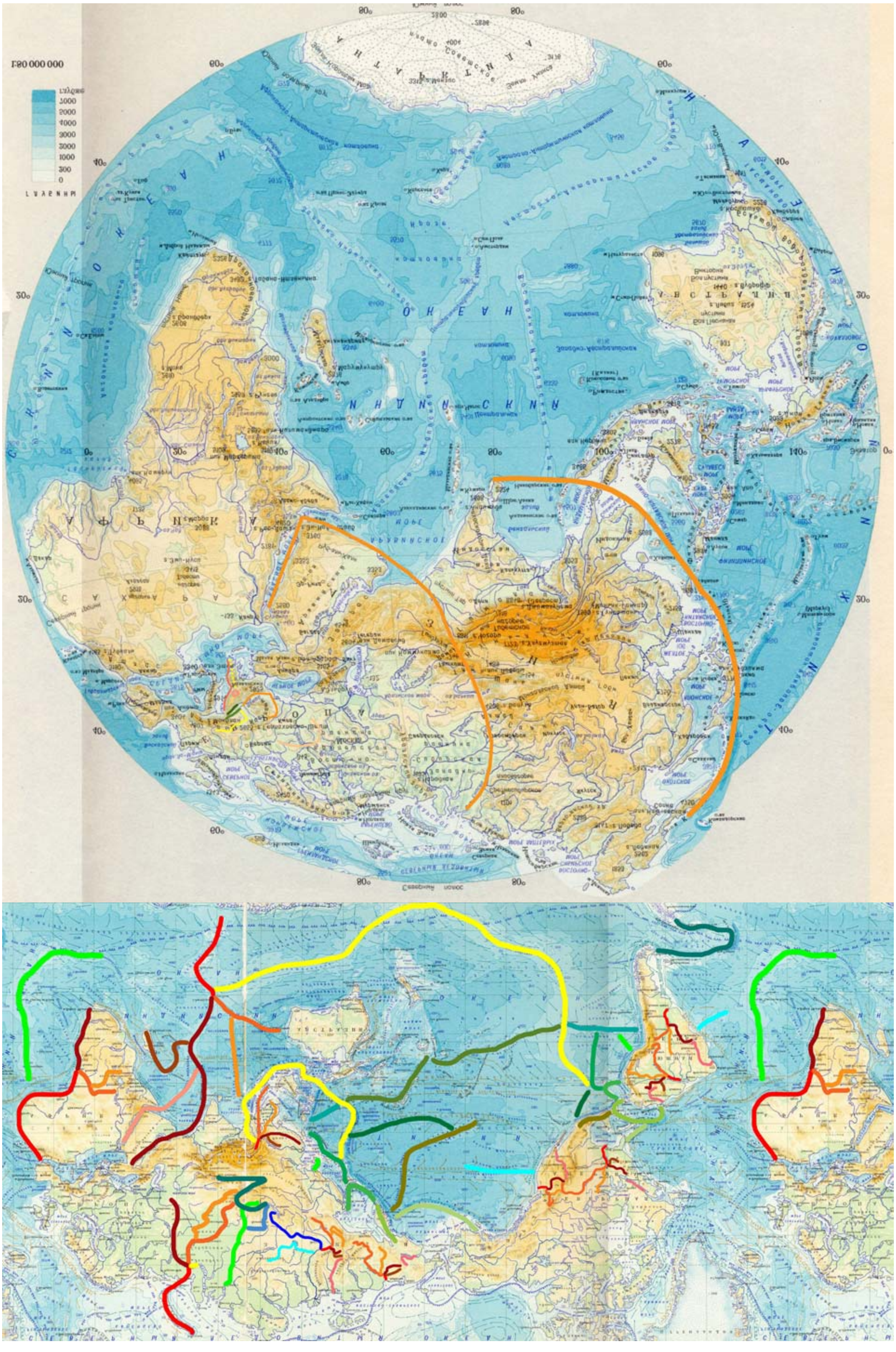

Fig. 18. Upper: The Balkan Tycho Butterfly (mirrored). Africa is stretched along the butterfly's main ray. **Lower:** Two yellow waves (Fig. 12). See [1:15, Fig. 1].

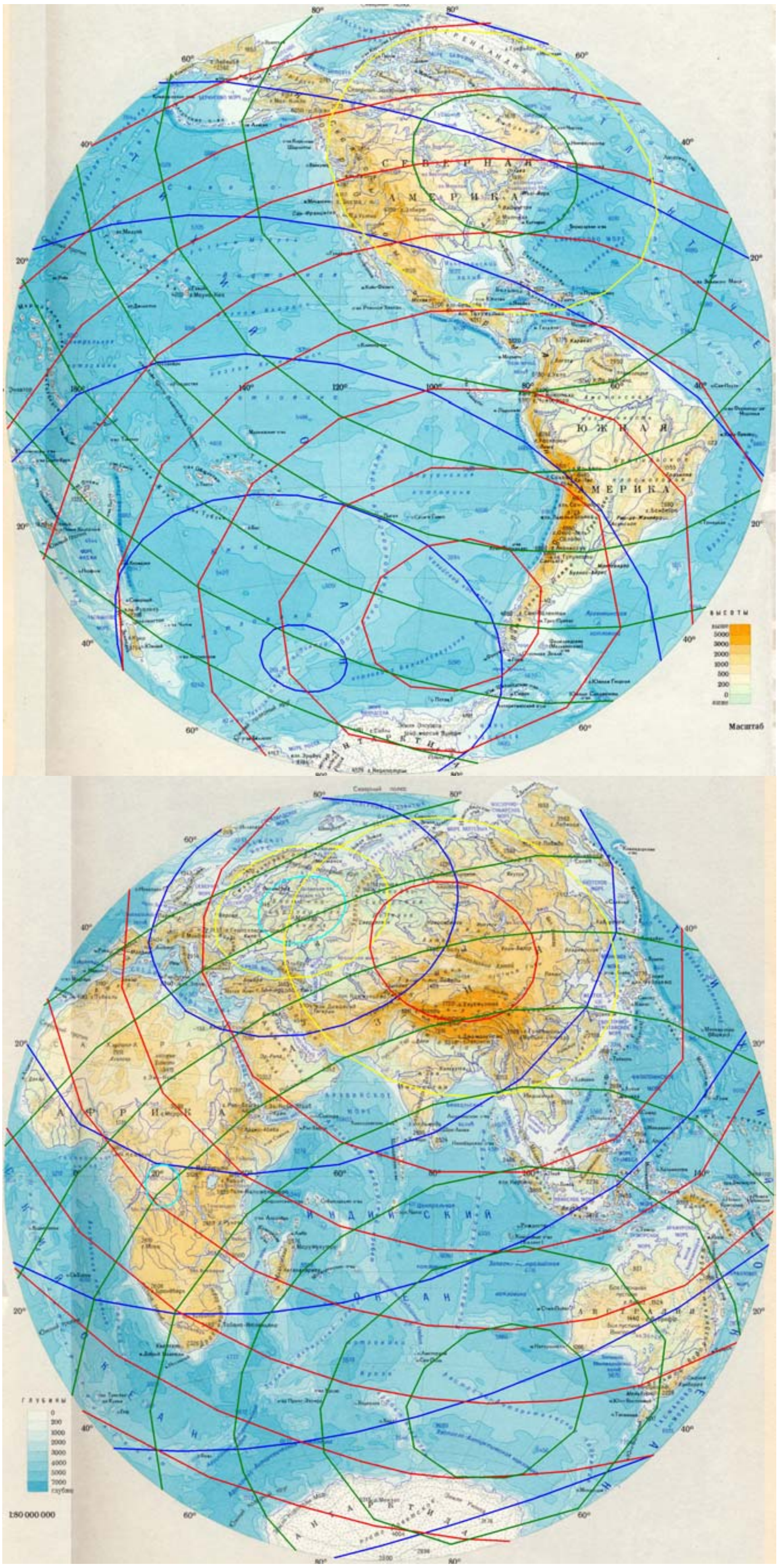

Fig. 19. Discrete fields, centered in American and Asian continental basins and in Yaroslavl [1:18, Fig. 3]. Easter Island's (Fig. 6), Pamirian (Fig. 8), Philippinian (Fig. 12), Balkan (Fig. 16) "Tycho Craters" are singular points of this structure. Circles with radii 2,5 and $10(\pi - 3)$ radians go through Easter Island's Tycho. Circles with radii 0,5 and $2(\pi - 3)$ radians go through Pamirian Tycho. Circles with radii 1,5 and $14(\pi - 3)$ radians go through Philippinian Tycho. Circles with radii $6(\pi - 3)$ and $8(\pi - 3)$ radians go through Balkan Tycho.

11. Tycho Butterflies

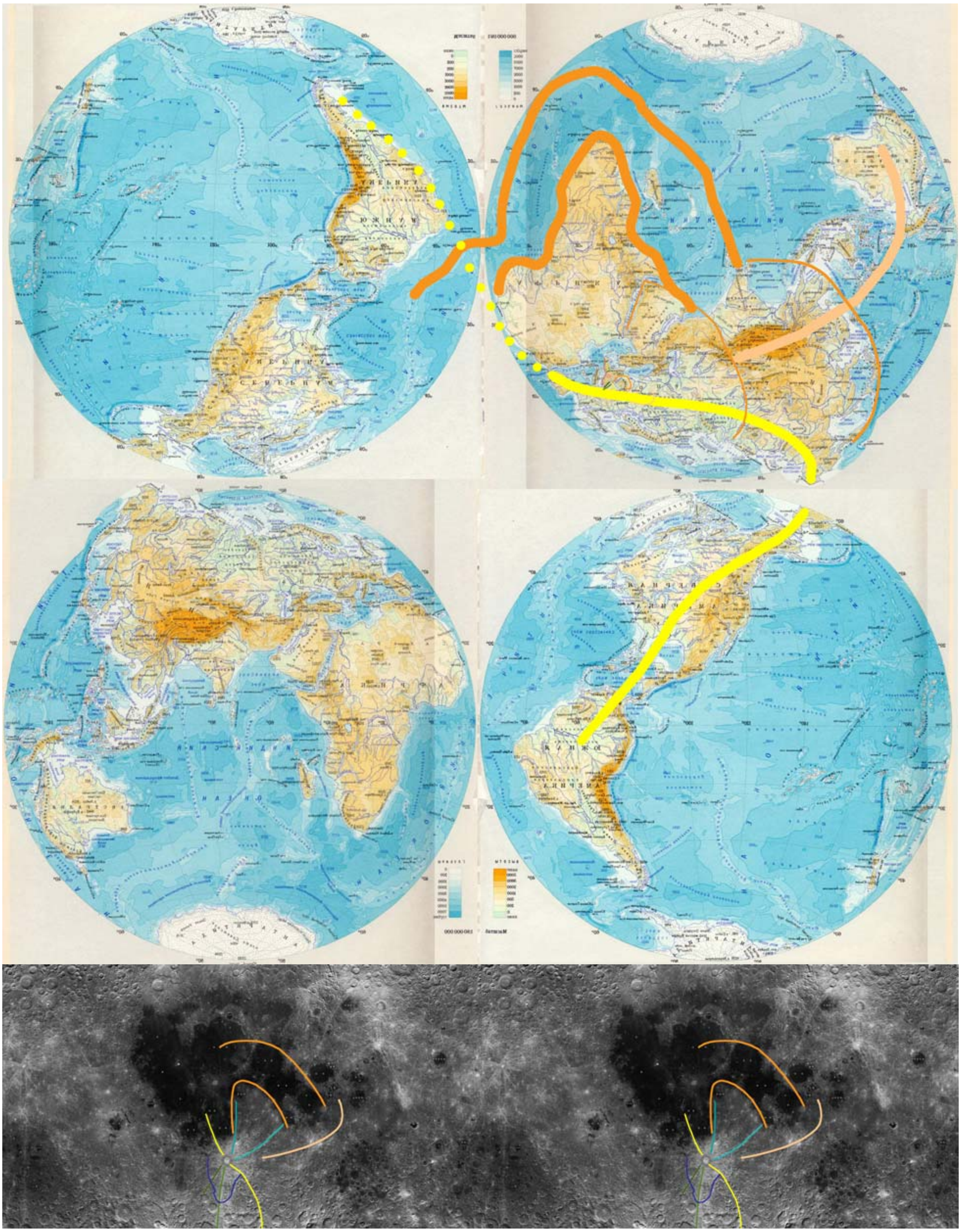

Fig. 1. Upper: The Eurasian Tycho Butterfly is generated by the Balkan Tycho Butterfly (Fig. 10.16-10.18, 10.12 lower). Africa is stretched along the Balkan Butterfly's main (yellow) ray. Analogously, South America is stretched along the hypothetical main ray (Spain) of the Eurasian Butterfly. The head of the Eurasian Butterfly is placed at England region. **Lower:** The Moon. The Tycho Butterfly. The 2-nd orange wave goes through the center of Mare Imbrium (corresponds to the Earthen Indian Ocean [4, Fig. 25]). It is shown in [4] that Tycho and Mare Imbtium are dependent: some lunar seas belong to the sistem of Mare Imbrium [4, Fig. 12-16], and the same seas belong to the system of the Tycho Butterfly [4, Fig. 20].

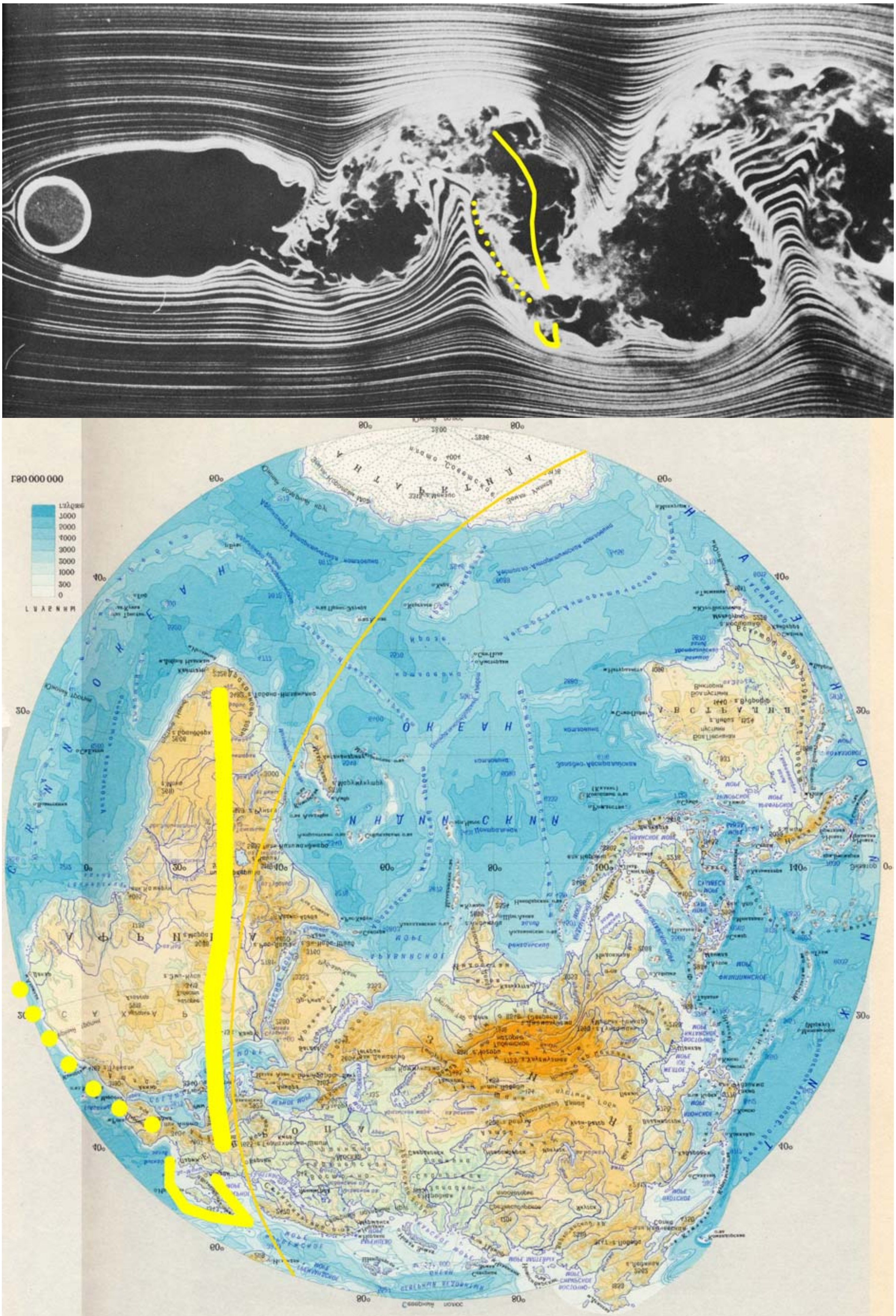

Fig. 2. Upper: Oscillating trace in liquid behind streamlined cylinder [6, ph. 48]. Re = 10 000. Two “rays” issue from England: Spain (the main ray) and Africa. **Lower:** Thin yellow straight line prolongates the main ray of the Balkan Tycho Butterfly (Fig. 10.16-10.18).

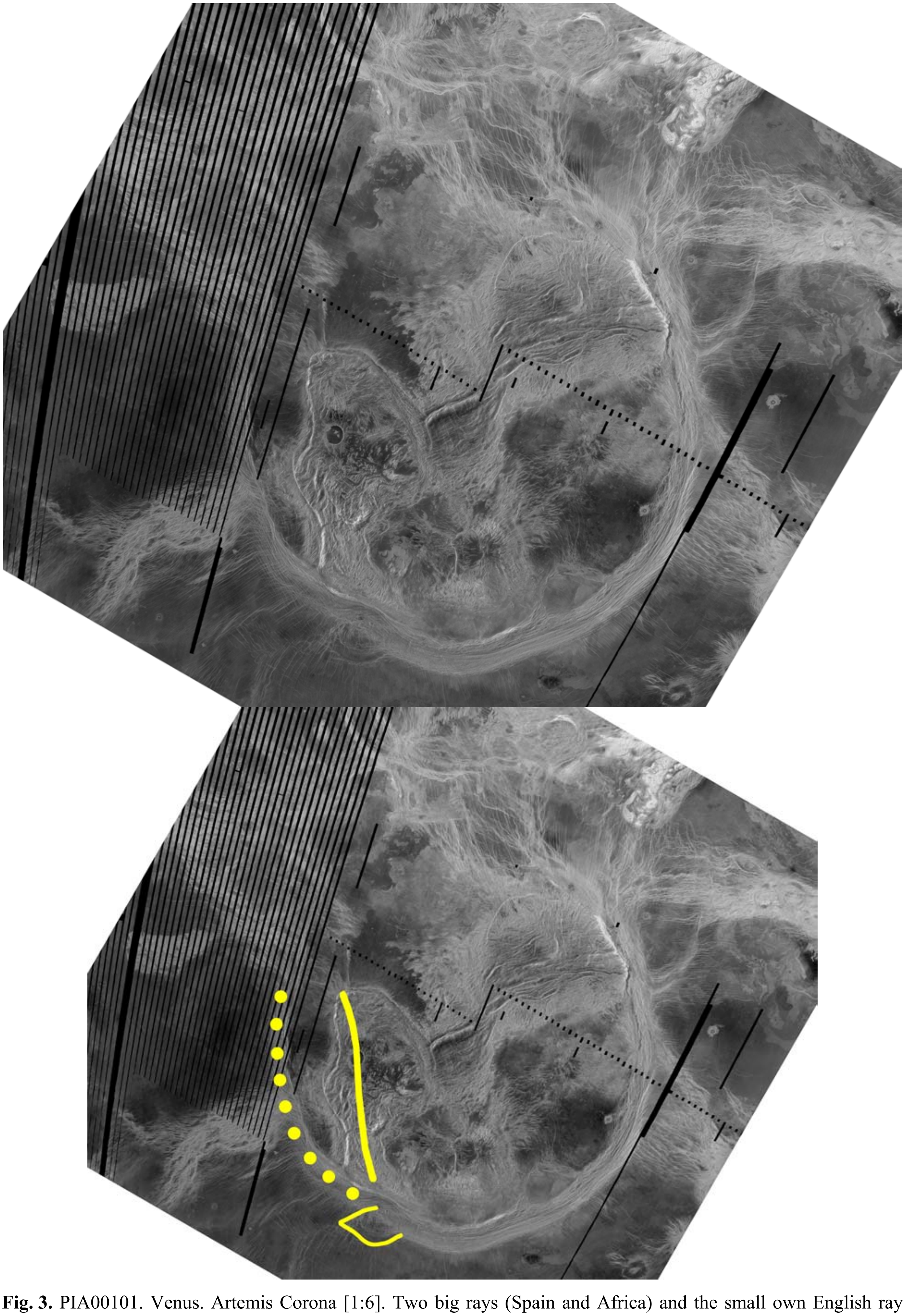

Fig. 3. PIA00101. Venus. Artemis Corona [1:6]. Two big rays (Spain and Africa) and the small own English ray issue from England.

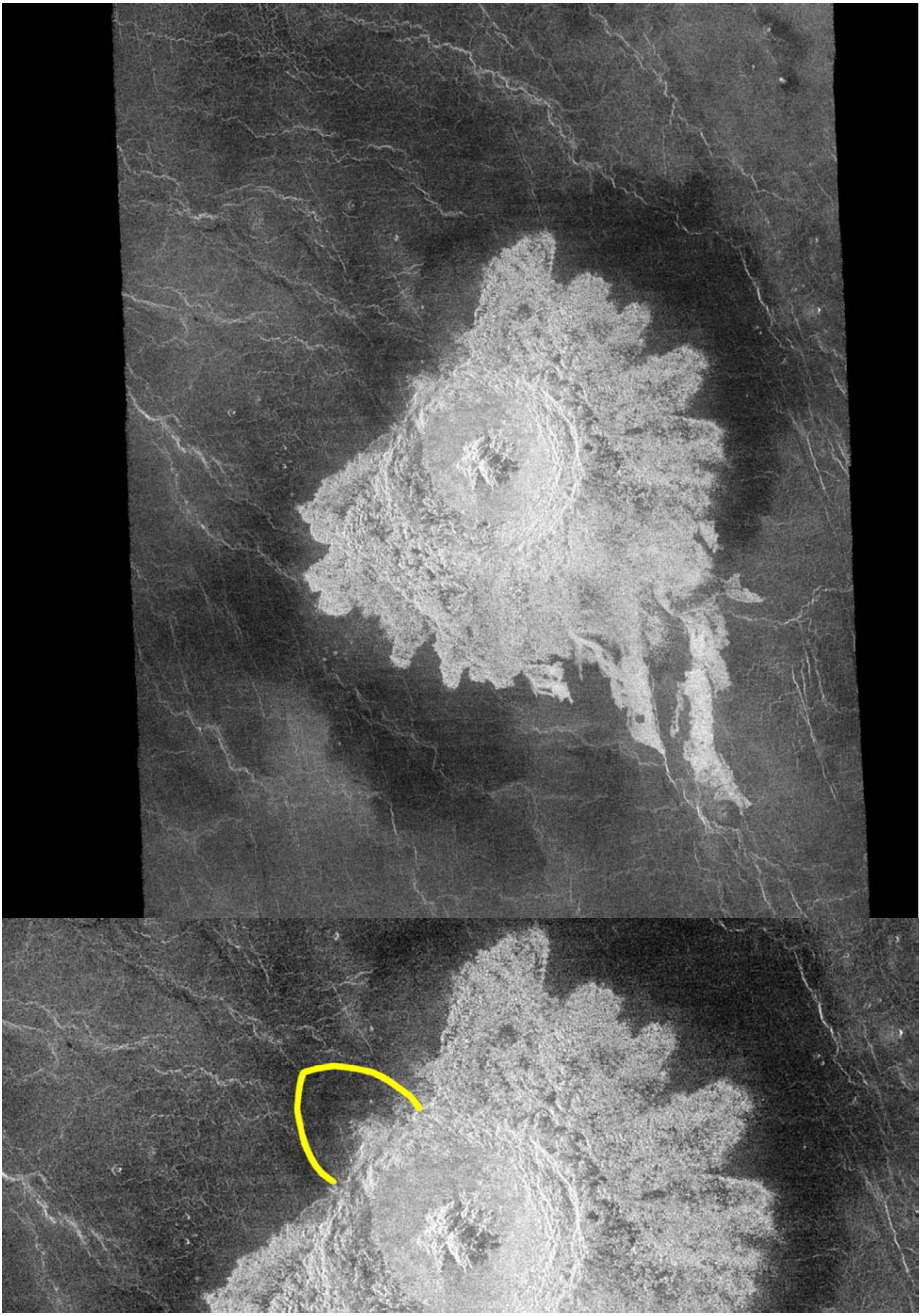

Fig. 4. PIA00239. Venus. Aurelia, a crater, (20.3^0 N, 331.8^0 E), the diameter is 32 *km*. The "end of Lake Michigan" is colored by yellow (Fig. 5).

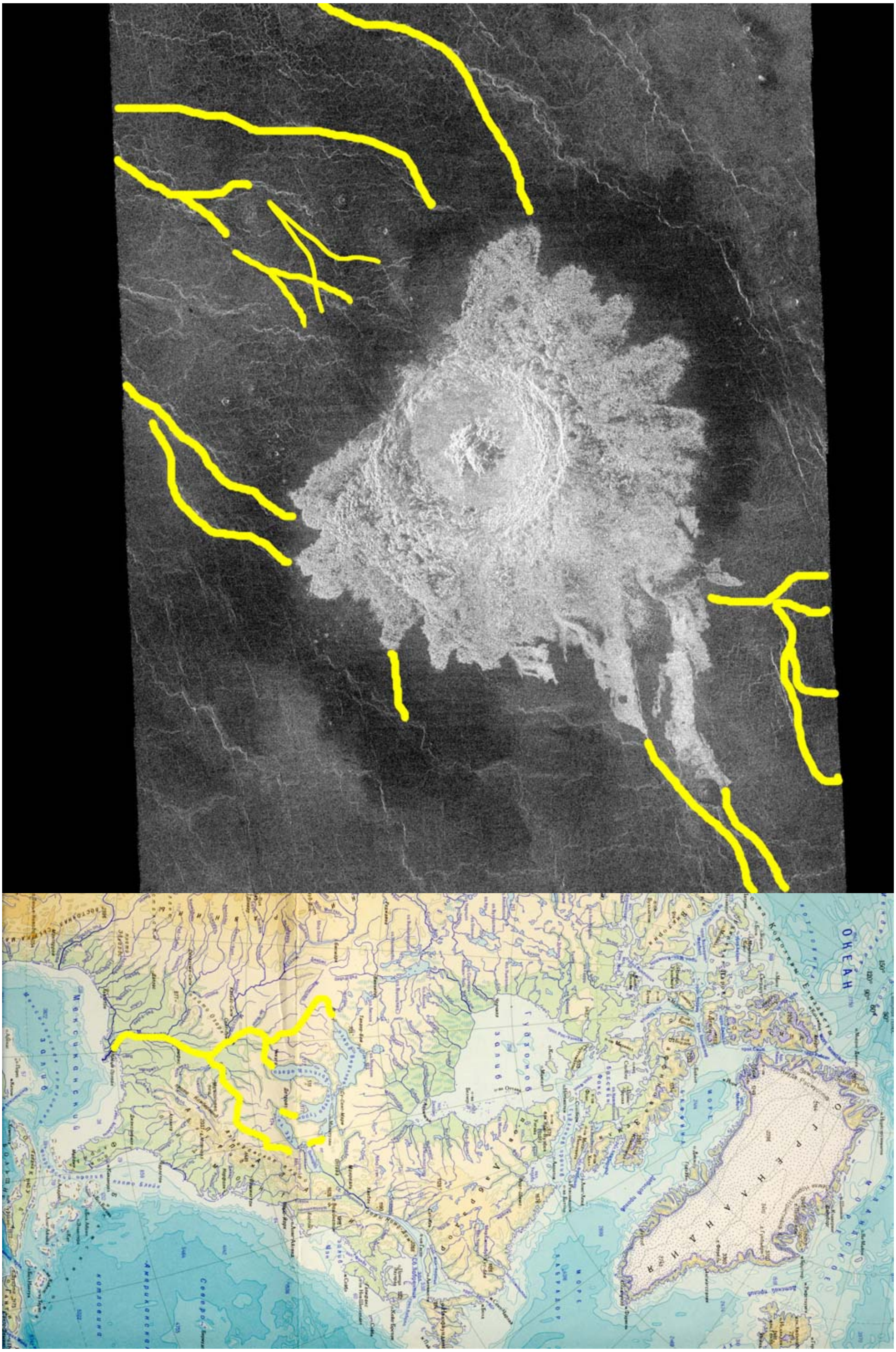

Fig. 5. Mississippilike lines grow up from ledges. The “tail” is a Gulf of Saint Lawrence.

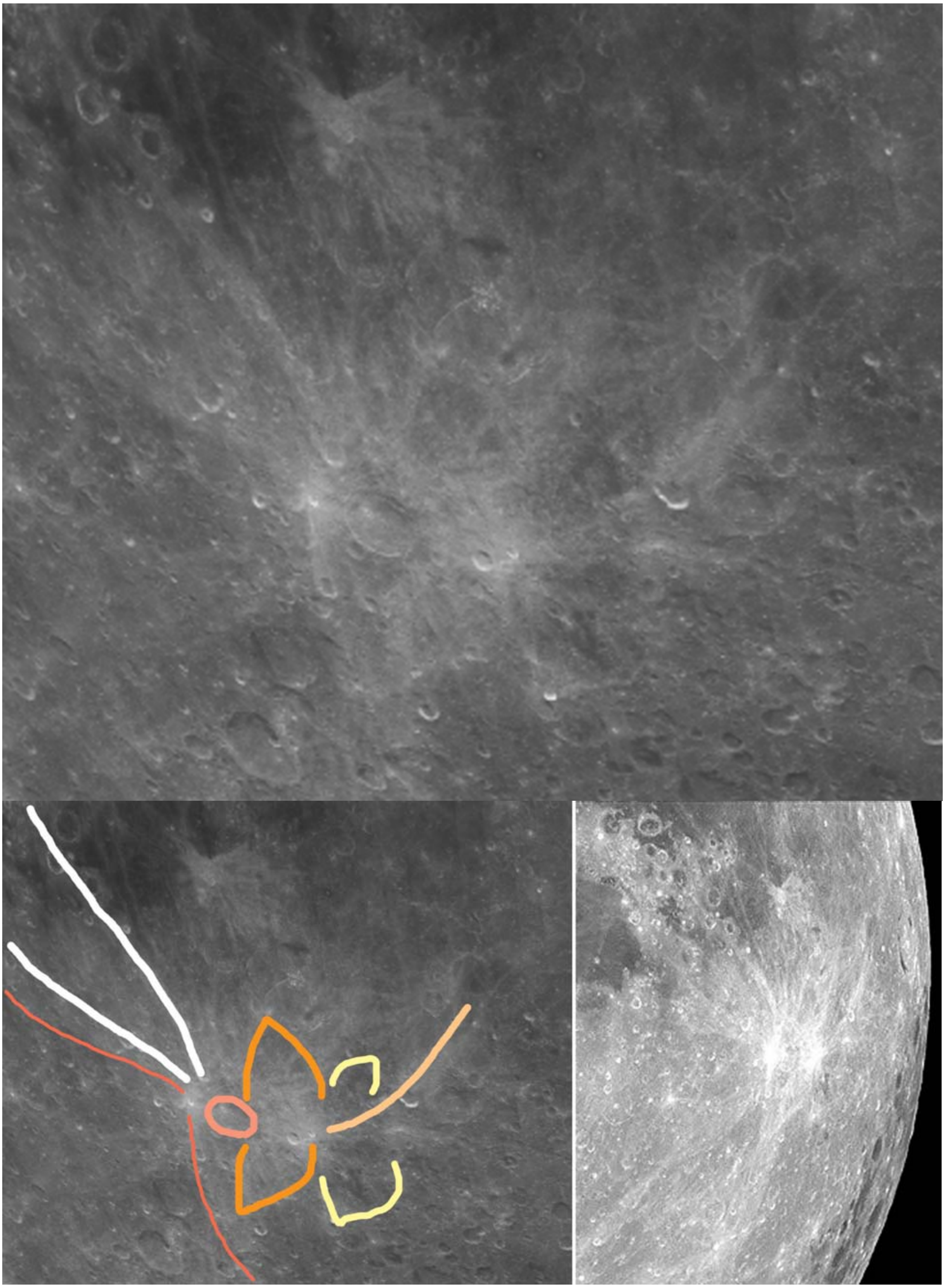

Fig. 6. The Stevinus Butterfly from the tail of Tycho [4, Fig. 20-21] has complex structure.

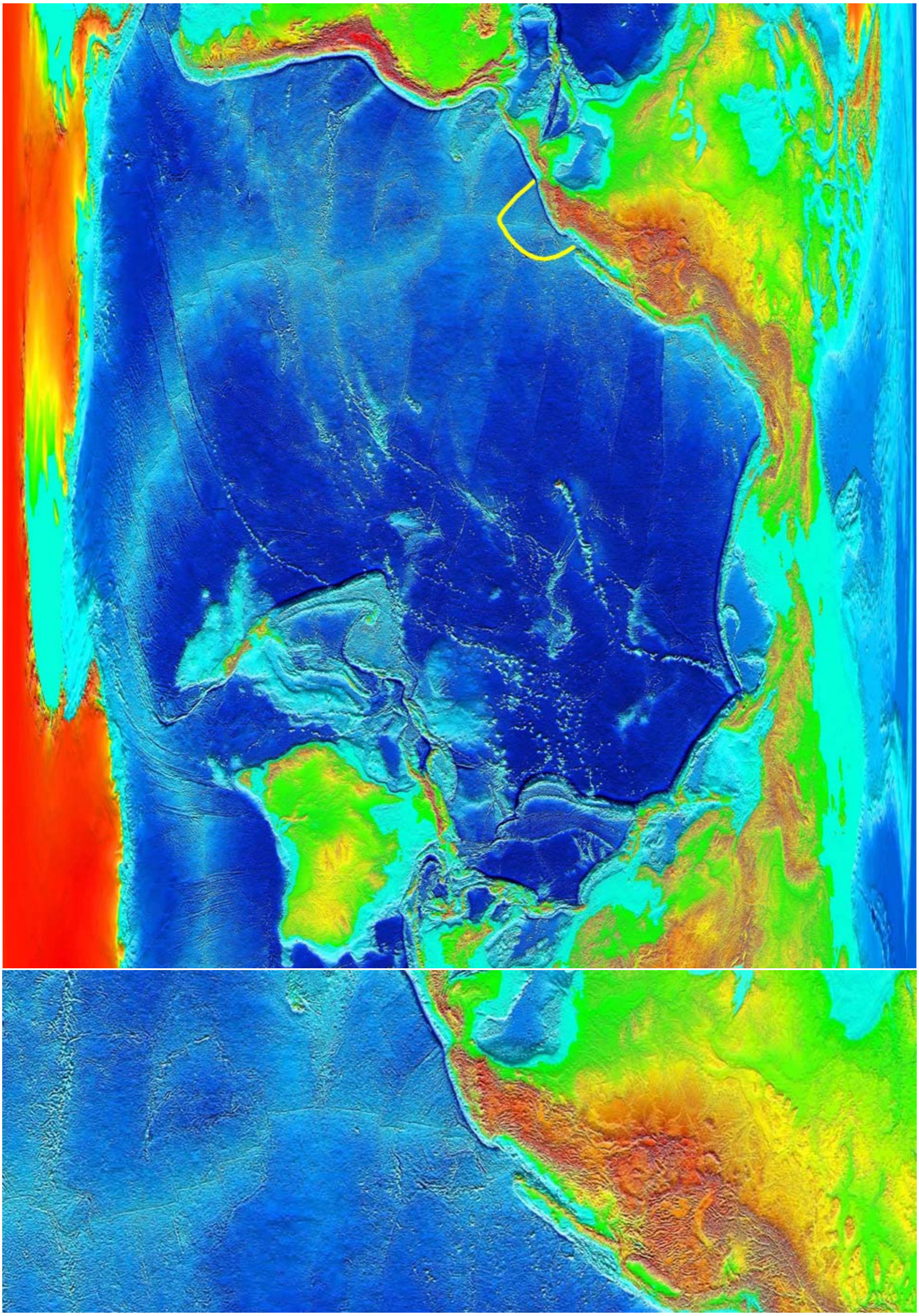

Fig. 7. America is a Tycho Butterfly. England is colored by yellow. The ray of the Appalachians corresponds to Africa from Fig. 2. A “Tycho Crater” here has complex structure, as far as Stevinus’ “Tycho Crater” (Fig. 6).

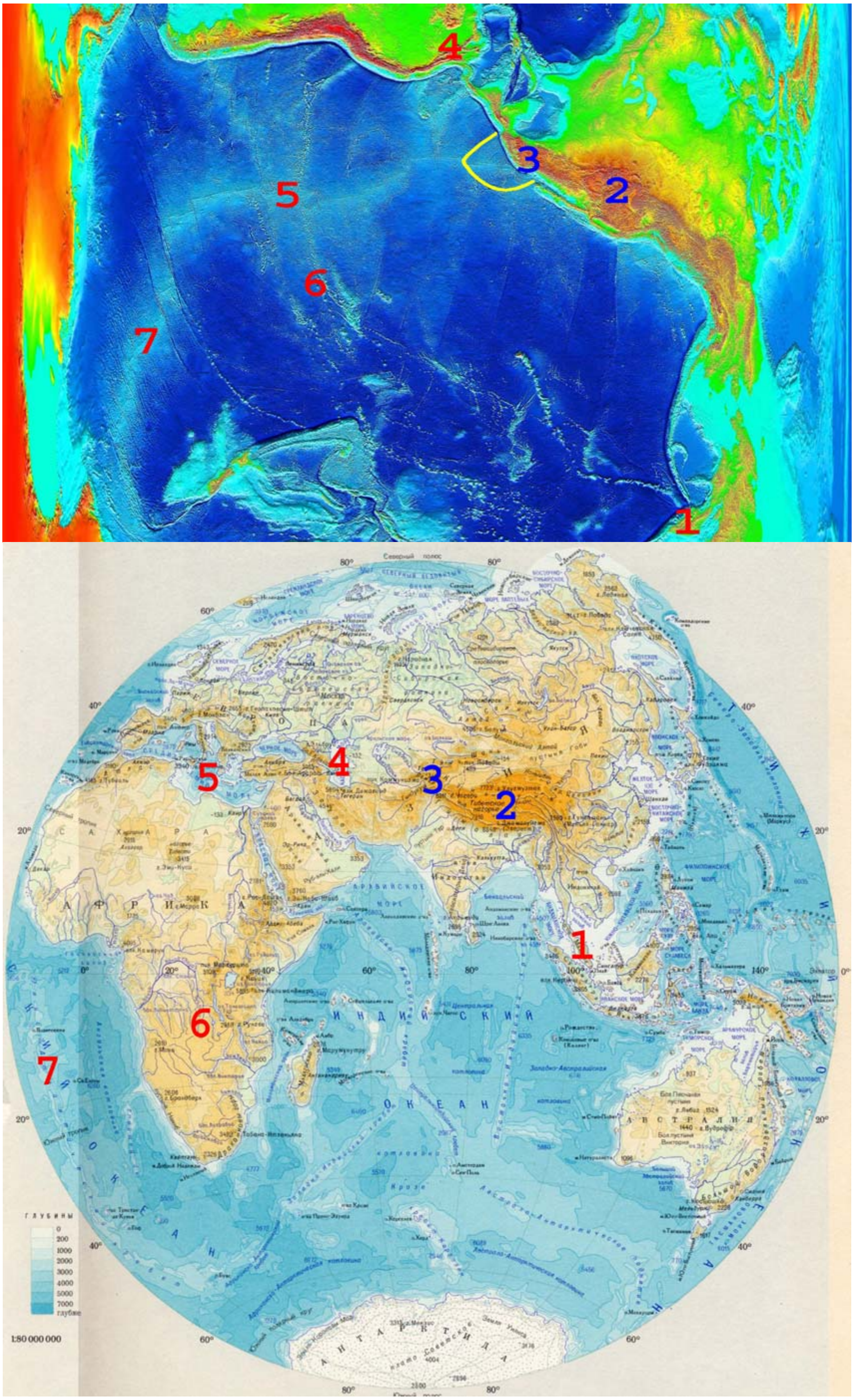

Fig. 8. Two pairs of contrary Tycho Butterflies. **Upper:** Opposite the American Butterfly there is the Pacific Butterfly (Fig. 10.6). There is a local Caspian Sea between them (Fig. 7.5 upper). Maybe the Caribbean Sea is the local Caspian Sea. **Lower:** The Hymalayan Tycho Butterfly is an analog of the American Butterfly [1:5].

Fig. 9. The Mediterranean Sea and the Hymalayas. The Hymalayas are a Tycho Butterfly (Fig. 10.8, 10.12 lower). In the Hymalayan Butterfly there are two "Tycho Craters" at least: the Pamir Mountains and the "Bering Strait" [1:5, Fig. 1-3], by analogy with the Stevinus Butterfly (Fig. 6 lower right). An antipode of Easter Island (the red point) is on one side of the Pamir Mountains, accordingly to Fig. 1-3. The Philippinian Caspian Sea is represented at Fig. 4.7-4.8.

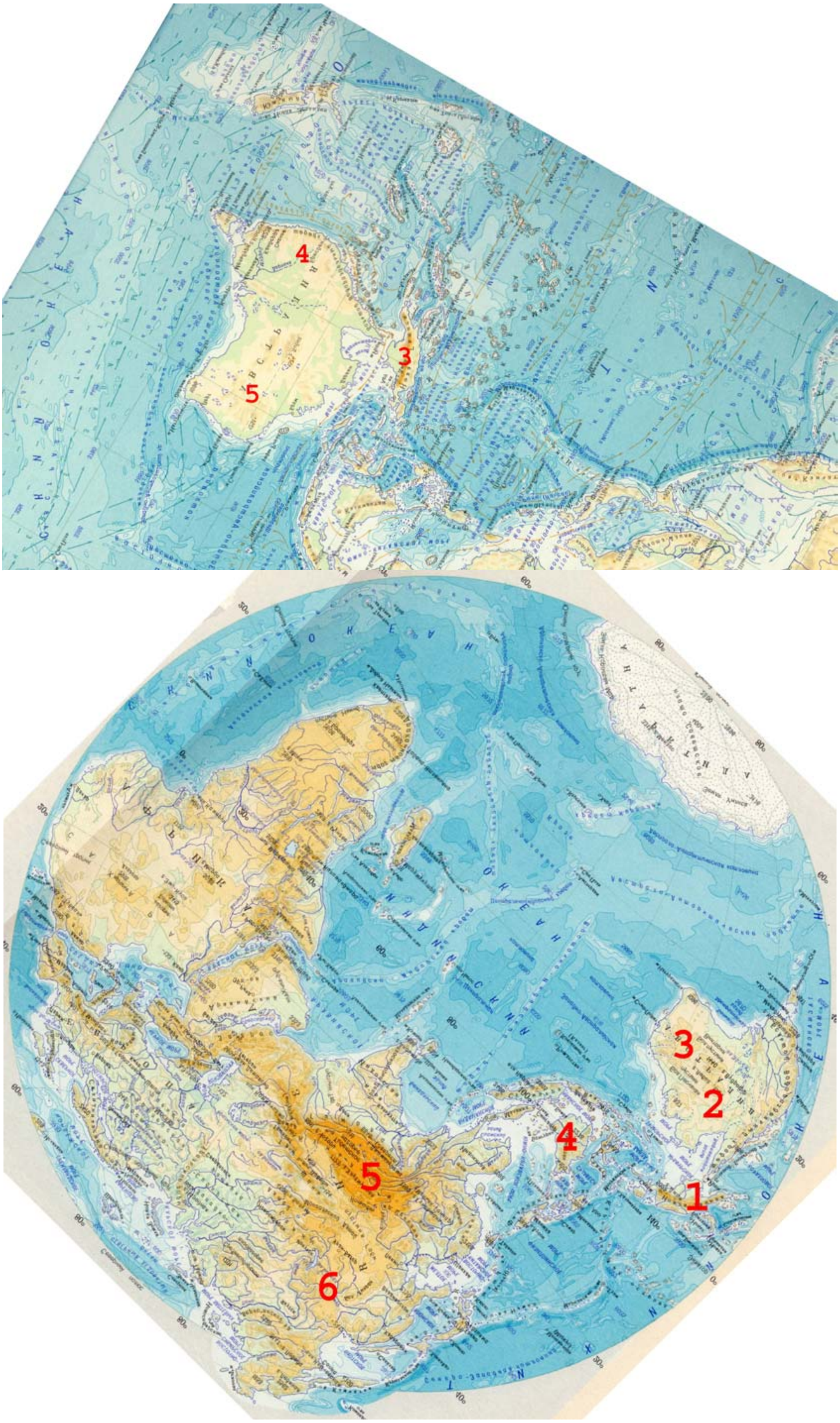

Fig. 10. Upper: Australia and the Hymalayas in notations of Fig. 9 (see Fig. 2.3, 2.5). **Lower:** The Hymalayas and Australia are the pair of countrary Tycho Butterflies, by analogy with Fig. 8 (in notations of Fig. 8). There is a local Caspian Sea (4) between them [1:4, Fig. 7-8], as far as at Fig. 8.

Fig. 11. Upper: A Karman vortex street behind a streamlined cylinder [6, Fig. 94]. Re = 140. The street is artificially expanded by mounting. Lower left: a separated node of the chain. This is a Tycho Butterfly. **Lower:** The Mediterranean Sea is a Karman vortex street. The street consists of two vortex chains, and distances between vortices increase uniformly. The position of a vortex in it's chain is predictable. Forms of the Apennines (3) and Balkans (7) are well according to the upper picture. At the region of the "Bering Strait" (between 7 and 8) there appears a cusp, it's singular point potentially could be a ray crater, that is a center of a "Tycho Butterfly". The Balkan Butterfly is placed in the region of the vortex (6), it is an element of internal structure of (6).

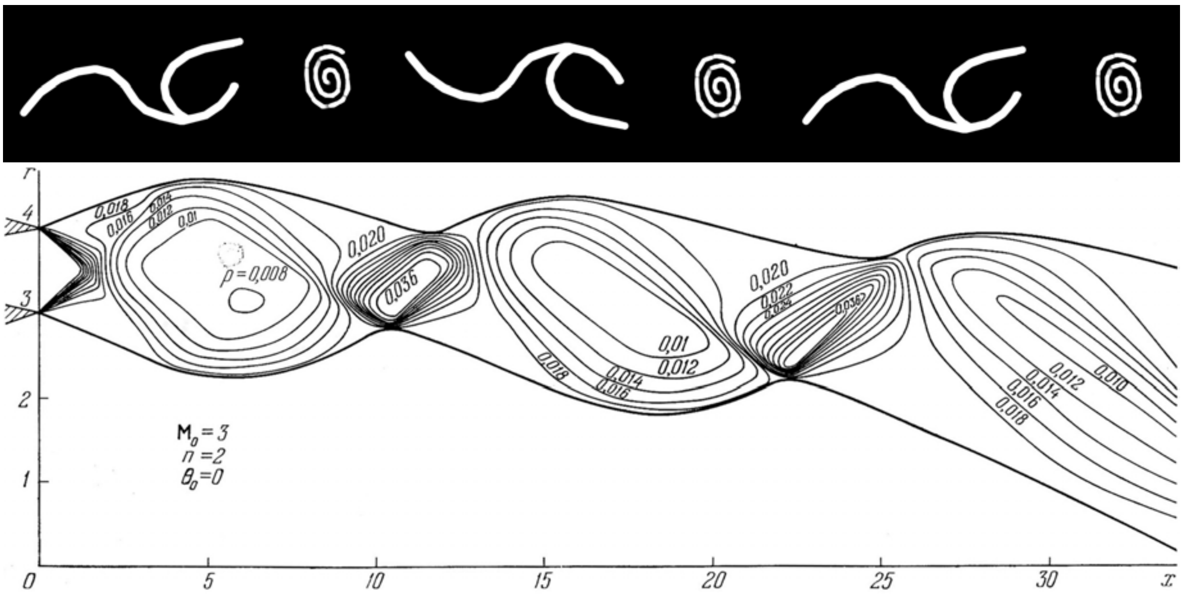

Fig. 12. Upper: The sequence of flows (a kind of global Karman vortex street) consists of the Mediterranean Sea, The Hymalayas, and Australia. Oval vortices are their Caspian Seas: the Caspian Sea, the Philippines + Sulawesi + Kalimantan (Borneo) (Fig. 4.7-4.8), New Zealand (Fig. 2.13 upper). Note that the Australian Tycho Butterfly connects to the Pacific Tycho Butterfly (Fig. 7-8) by New Zealand, and the Pacific Tycho Butterfly connects to the American Tycho Butterfly by the Venezuelian Caspian Sea (Fig. 8). **Lower:** An outflow of a supersonic (M = 3) ring jet into a flooded space [7, Fig. 50.4]. See Fig. 14.

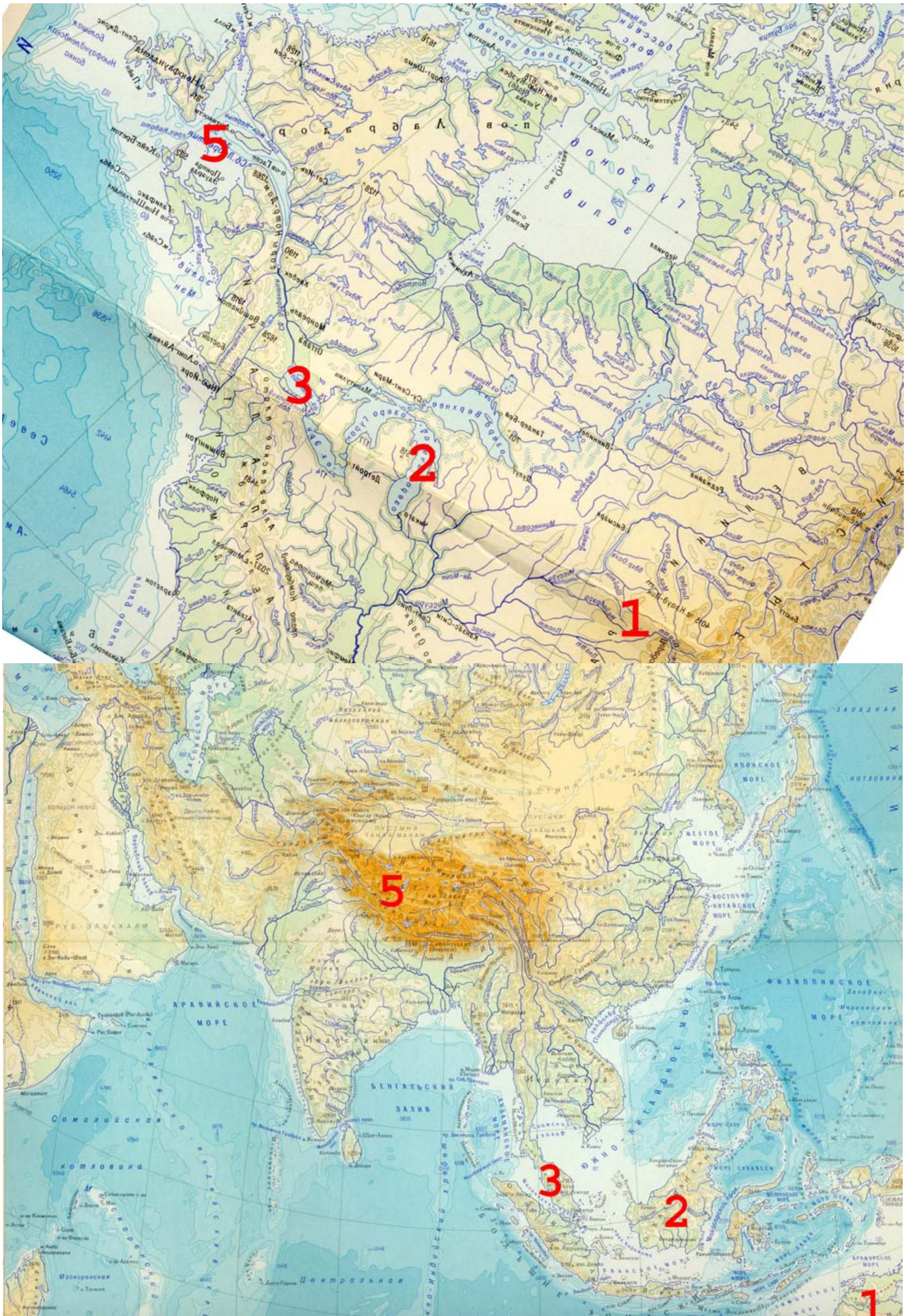

Fig. 13. The Saint Lawrentian Butterfly and the Hymalayan Butterfly in notations of Fig. 9. See Fig. 4.7, [1:10, Fig. 10].

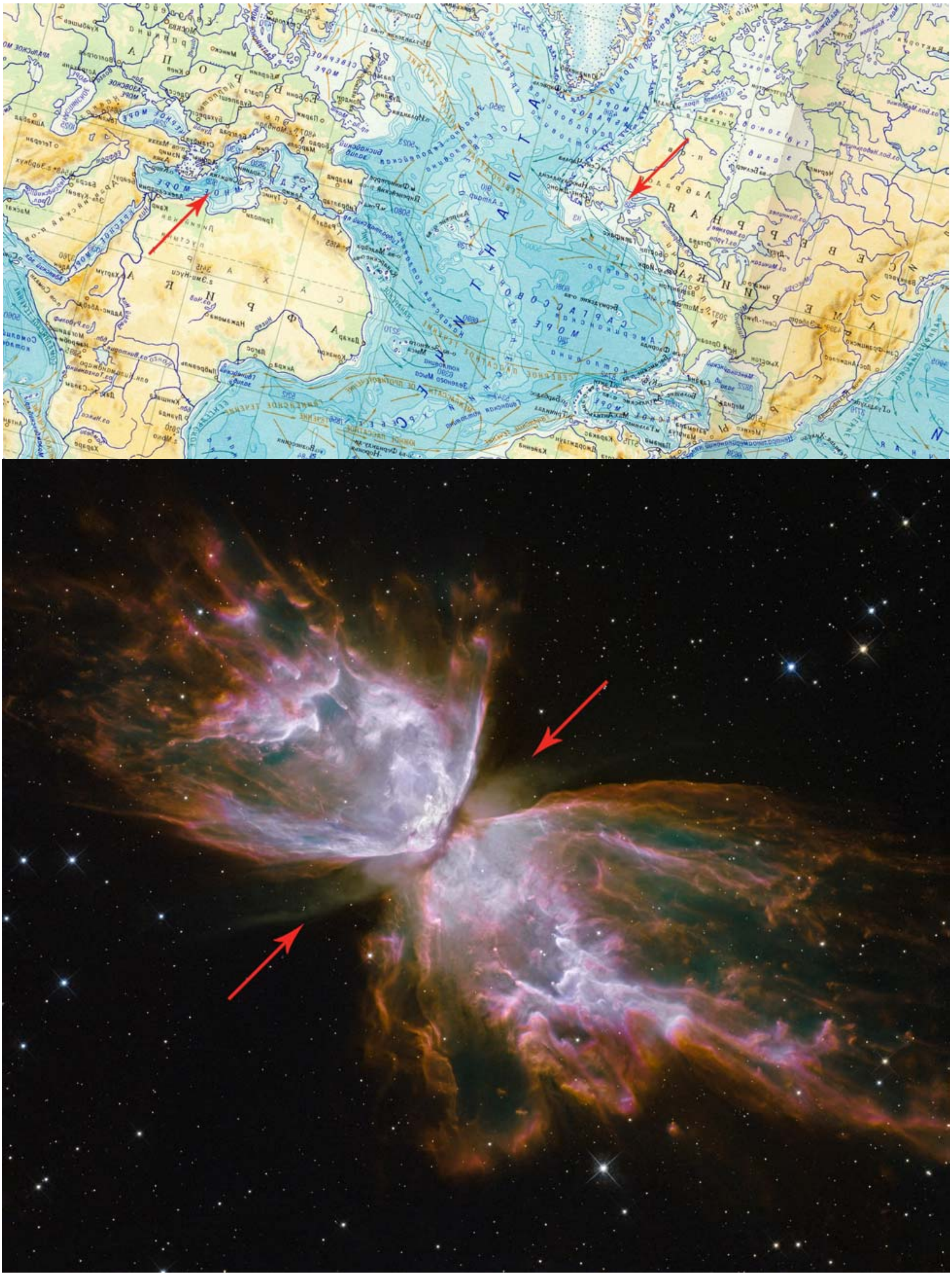

Fig. 14. Upper: The Saint Lawrentian Butterfly and the Mediterranean Butterfly fly away from the common center (the center is nearly at the Azores). This center approximately corresponds to the singular point of the "Bering Strait" (Fig. 11-12, Fig. 10.3), because the Atlantic is an Antarctida (Fig. 1.4) and a Caspian/Mediterranean Sea (Fig. 2.13 lower). **Lower:** The Butterfly Nebula (NGC 6302). Image: the Hubble Space Telescope. Symmetric side petals are pointed by arrows. See Fig. 12.

12. Petals of Tycho Craters

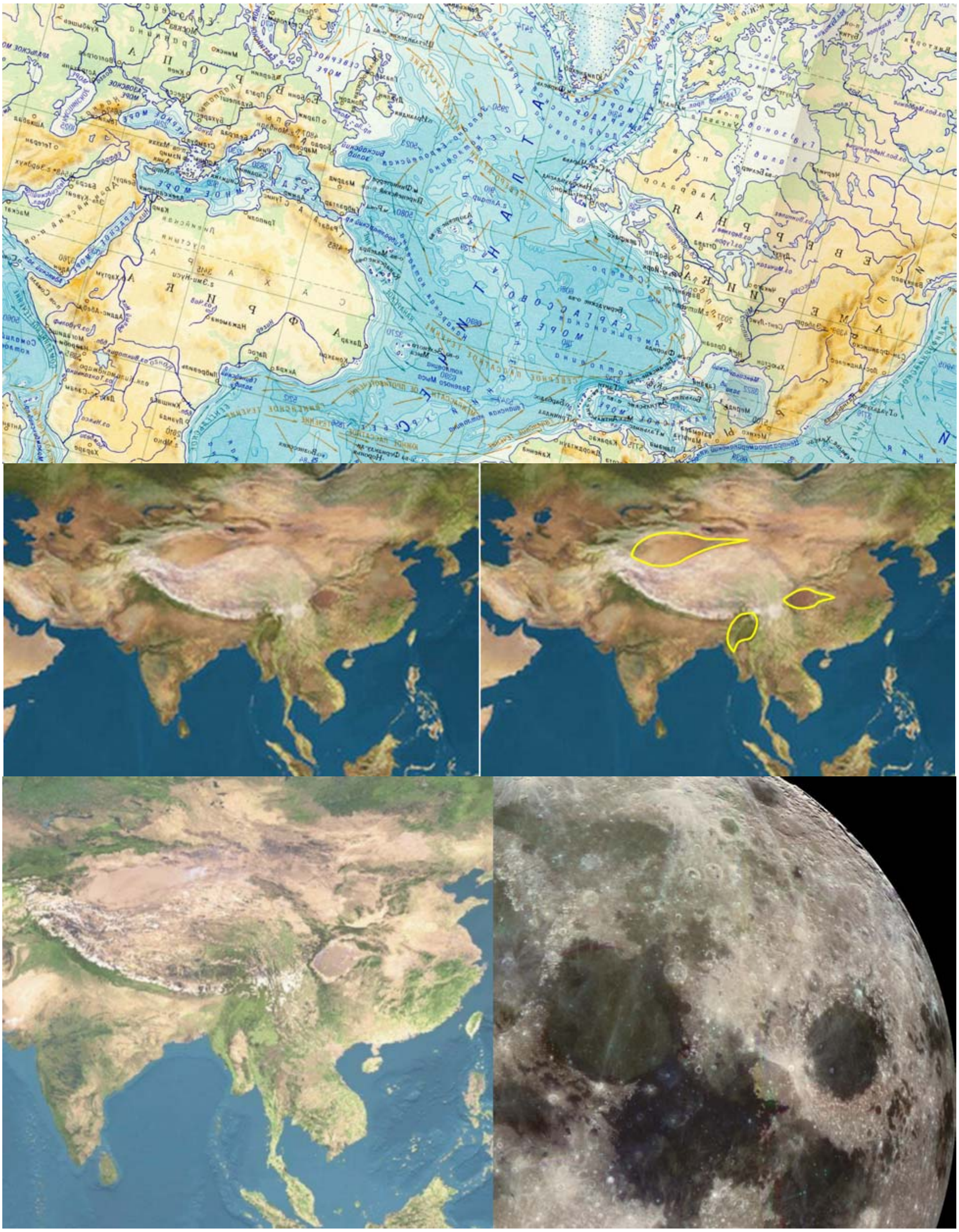

Fig. 1. Upper: The Saint Lawrentian Butterfly and the Mediterranean Butterfly fly away from the common center (the center is nearly at the Azores). This center approximately corresponds to the singular point of the “Bering Strait” (Fig. 11.11-11.12, 10.3), because the Atlantic is an Antarctida (Fig. 1.4) and a Caspian/Mediterranean Sea (Fig. 2.13 lower). **Center:** Petals issue from the Pamir and from the “Bering Strait” (from Hymalayan “Tycho Craters”). **Lower right:** The Moon, PIA00269. Mare Crisium is a petal issuing from Proclus, a ray crater [4, Fig. 17-19]. **Lower left:** A petal, analogous to Mare Crisium, issues from Hymalayan “Bering Strait”. Directions of rivers correspond to Proclus’ directions of rays. See Fig. 4.5-4.6.

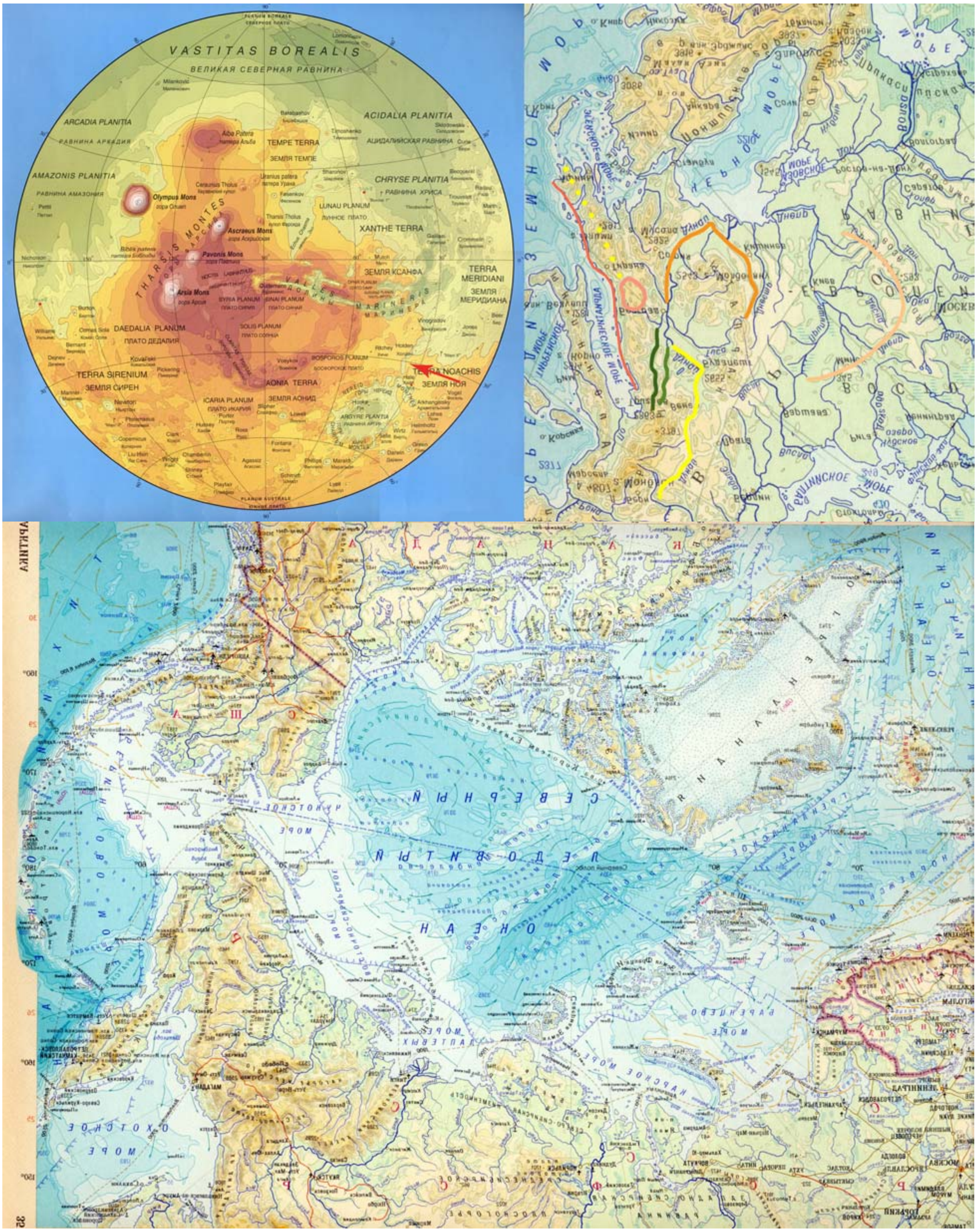

Fig. 2. Upper left: Mars, the GAISh map. Martian North America [1:2, Fig. 4], [1:9, Fig. 11] is an analog of the Hymalayan Tycho Butterfly. The "Bering Strait" is pointed by the arrow. Argyre (a green area down-left from the arrow) is a petal issuing from the "Bering Strait". **Upper right:** The Black Sea is a petal issuing from "Tycho Crater" of the Balkan Butterfly. **Lower:** The Bering Strait in (mirrored) orientation, corresponding to the Hymalayas (Fig. 1). To the right from it there is a set of enclosed petals (convex down), being contained by the Arctic Ocean [1:5, Fig. 1-2, element 3]. See Fig. 10.

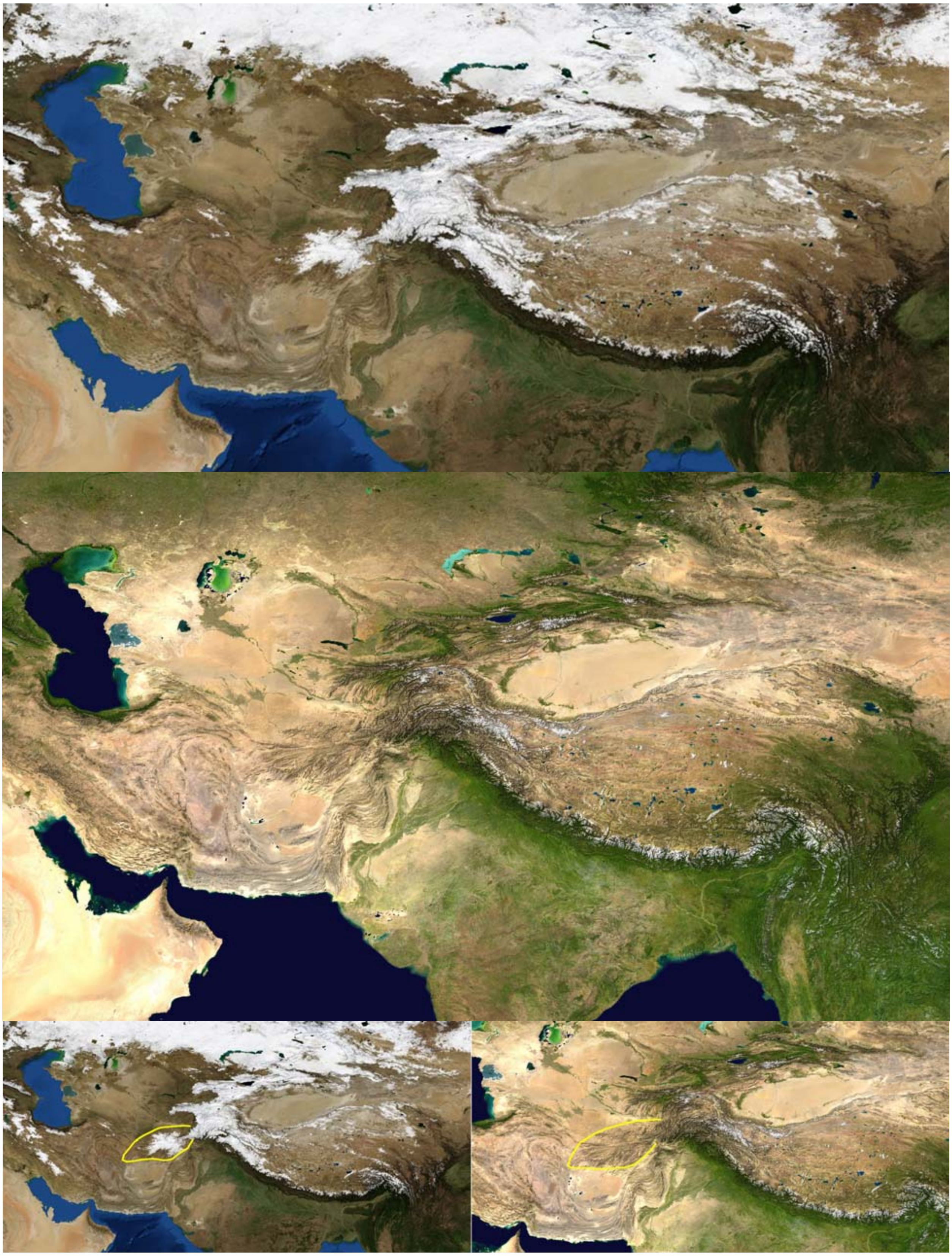

Fig. 3. Pamirian “Tycho Crater”, as far as the “Tycho Crater” of the Hymalayan “Bering Strait” (Fig. 1), has two symmetric petals. One of them (right) is convex down, another one (left) is convex up.

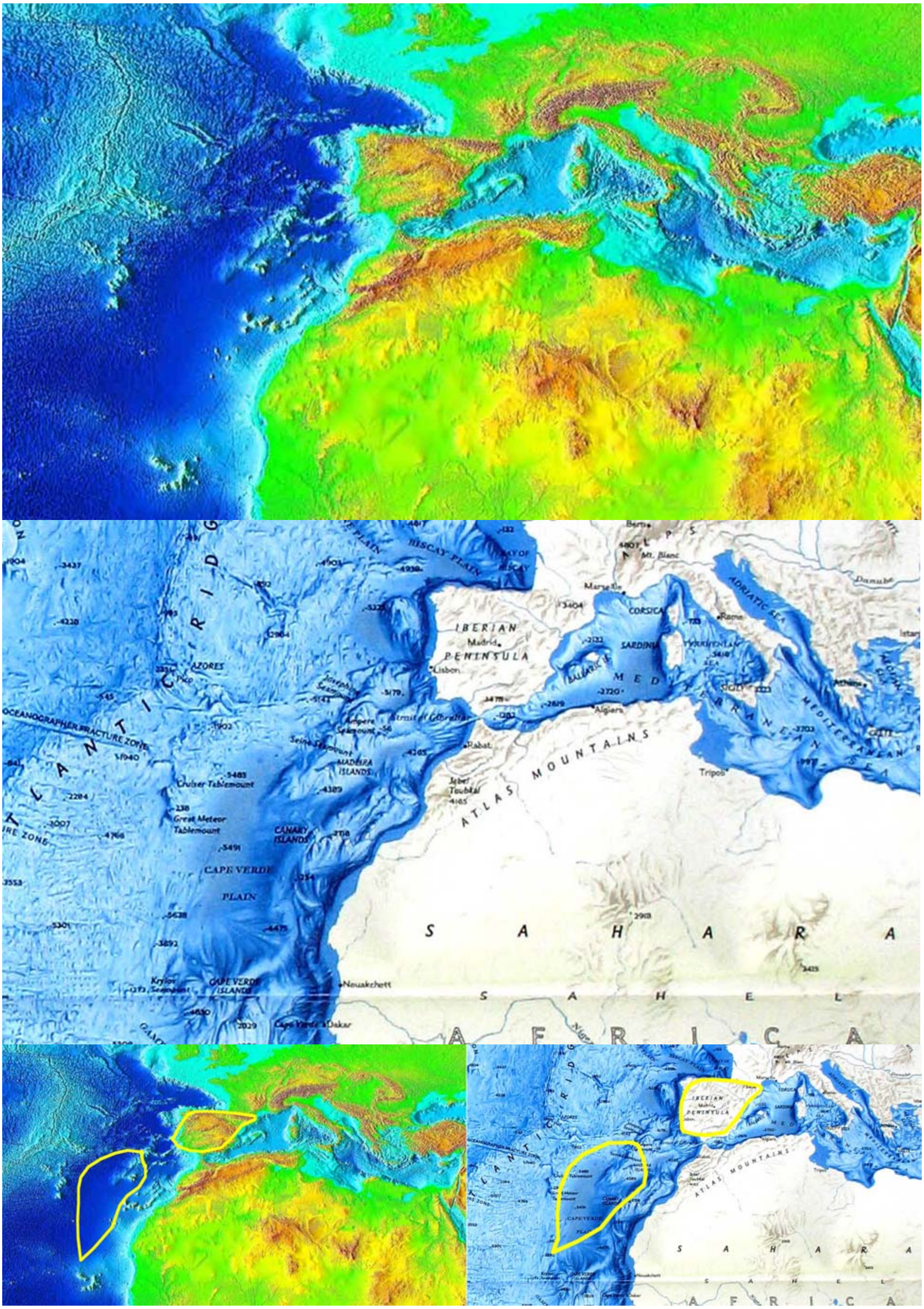

Fig. 4. The Mediterranean Sea, as far as the Hymalayas, has it's "Pamirian Tycho Crater", issuing two petals, convex down and convex up. The right petal (convex up) corresponds to the convex down petal of Pamirian "Tycho Crater" (Fig. 1, 3).

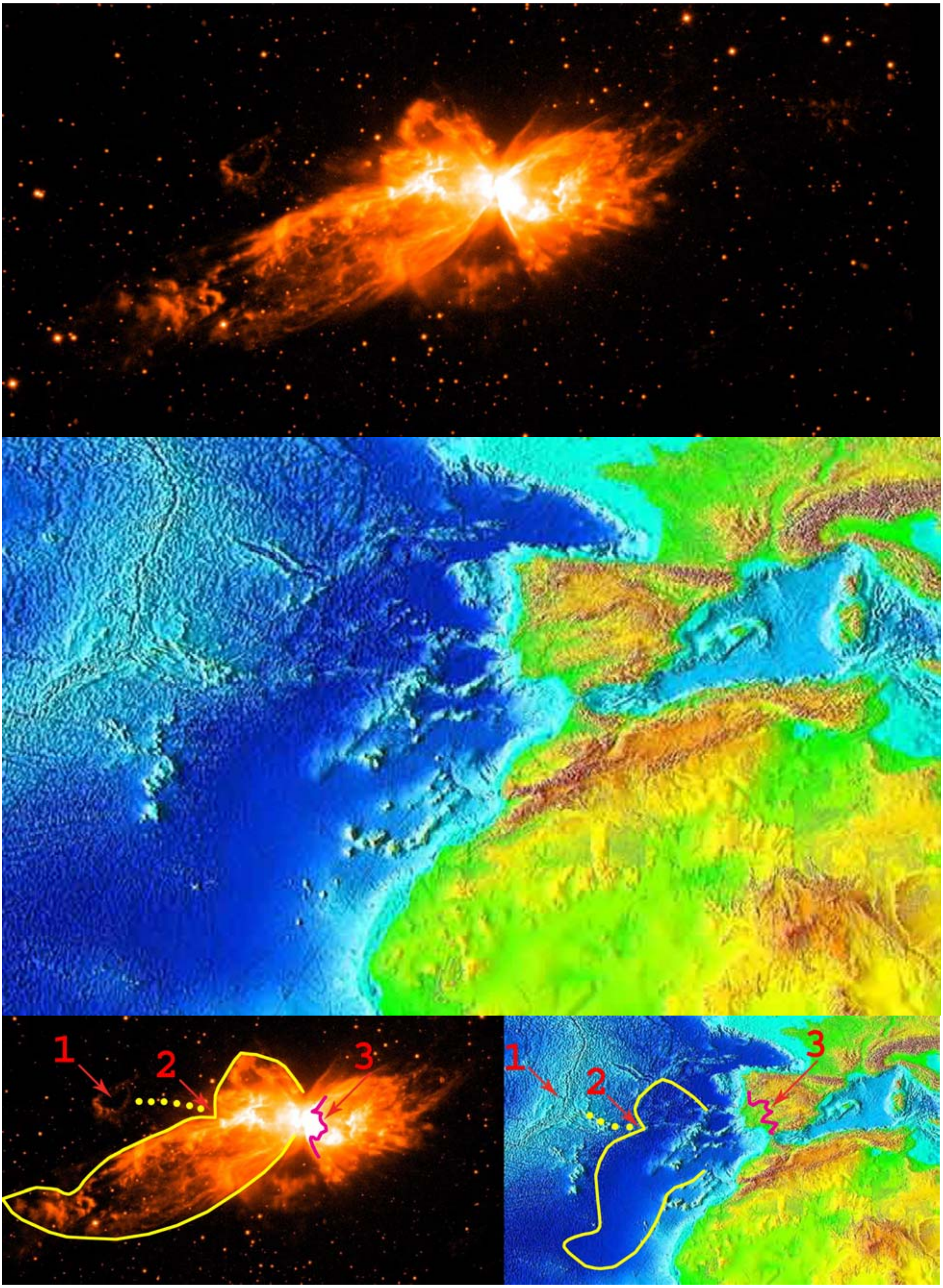

Fig. 5. The Butterfly Nebula (NGC 6302; image: R.L.M. Corradi, H.E. Schwarz) and the "Pamirian Tycho Crater" of the Mediterranean Sea (Fig. 4). 1 are the Azores (see Fig. 1 upper), 2 is a typical inner angle, 3 is a "coastline". The elements 1 and 2 are connected by some line.

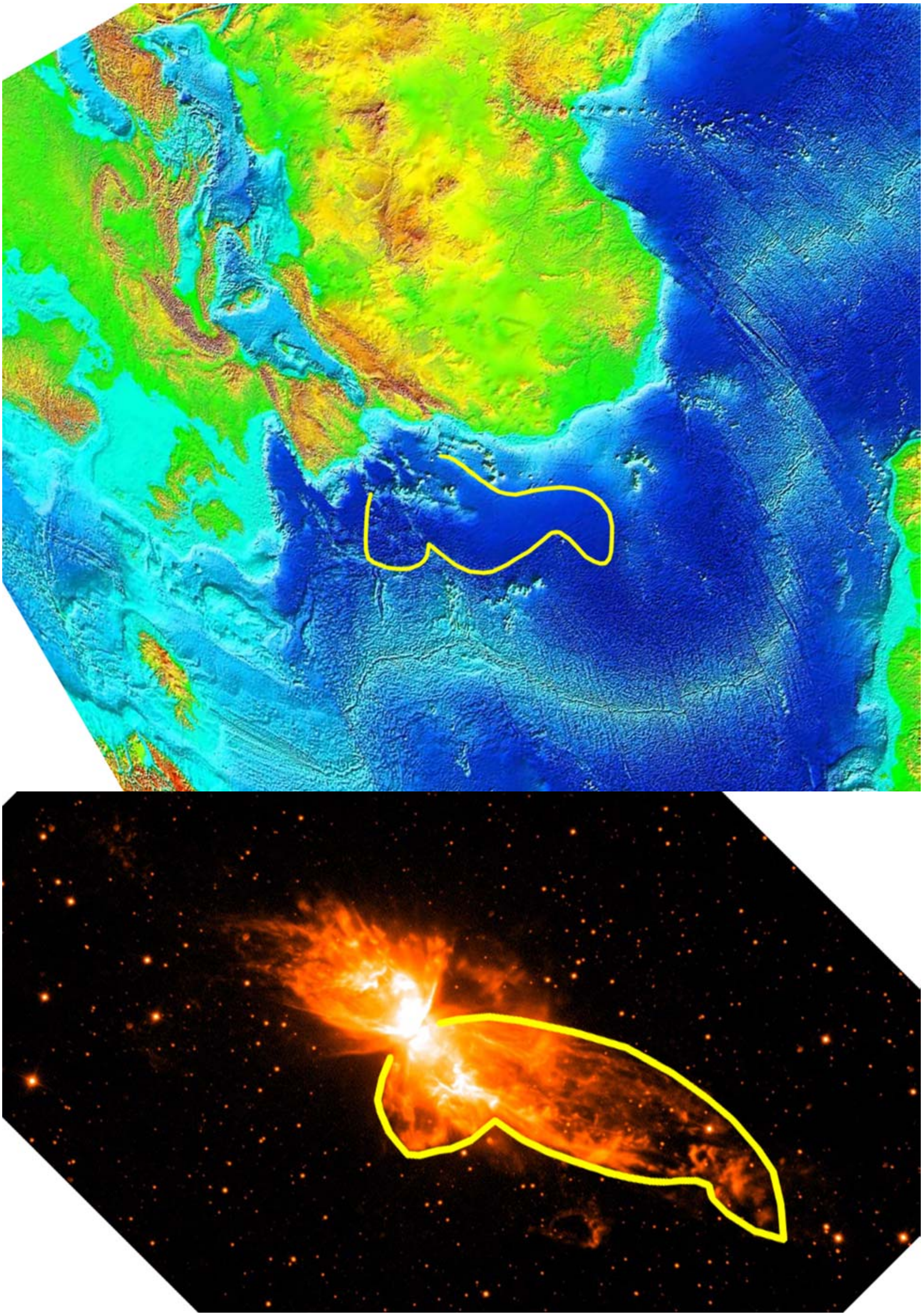

Fig. 6. Objects from Fig. 5 are analogous to the Hymalayan or Pacific Tycho Butterfly (Fig. 10.6-10.10). This picture clarifies nature of “the main ray of a Tycho Crater”.

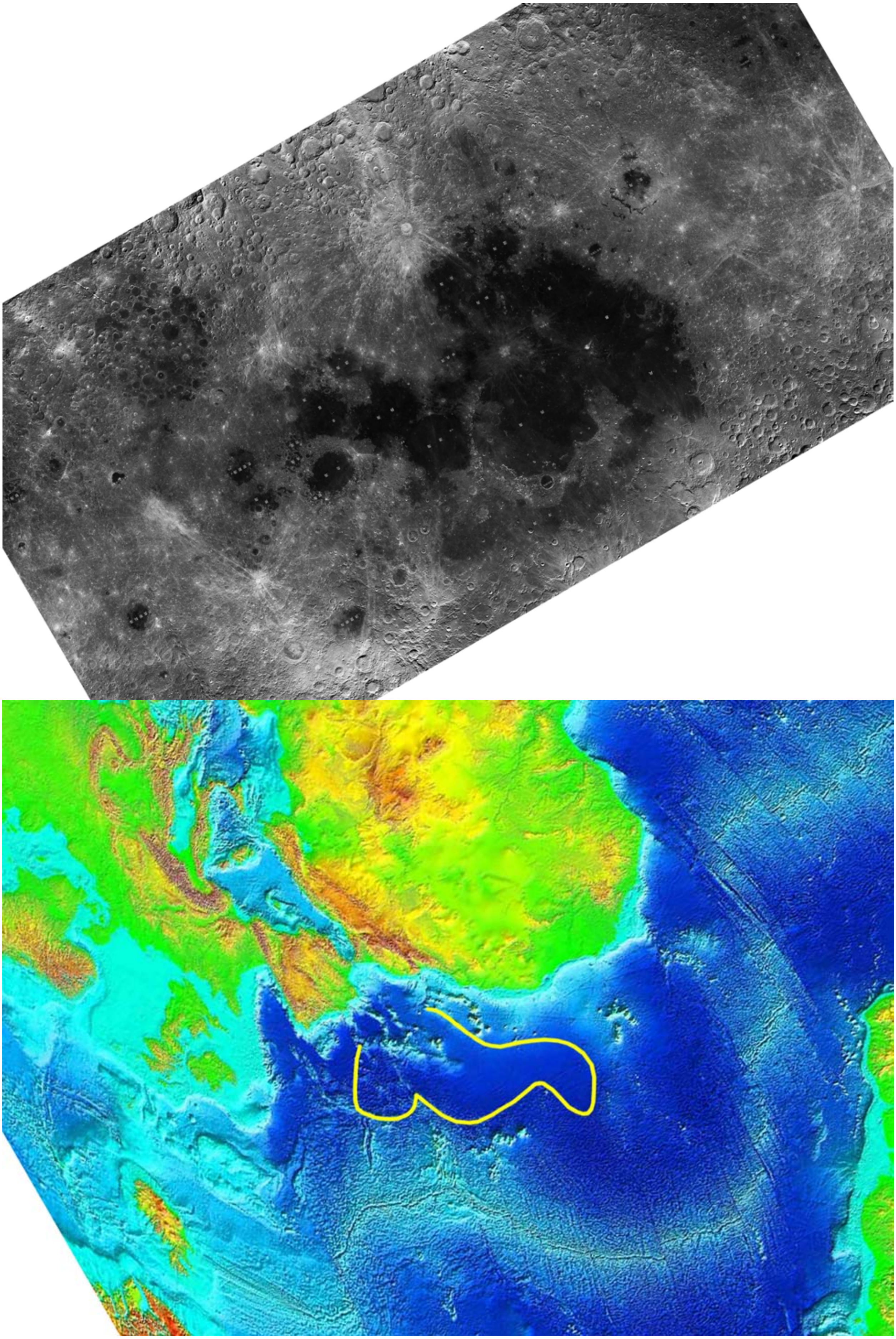

Fig. 7. Oceanus Procellarum is a petal of Tycho. The long tail (Mare Frigoris) is analogous to the tail of the Pacific Butterfly (Fig. 8 lower).

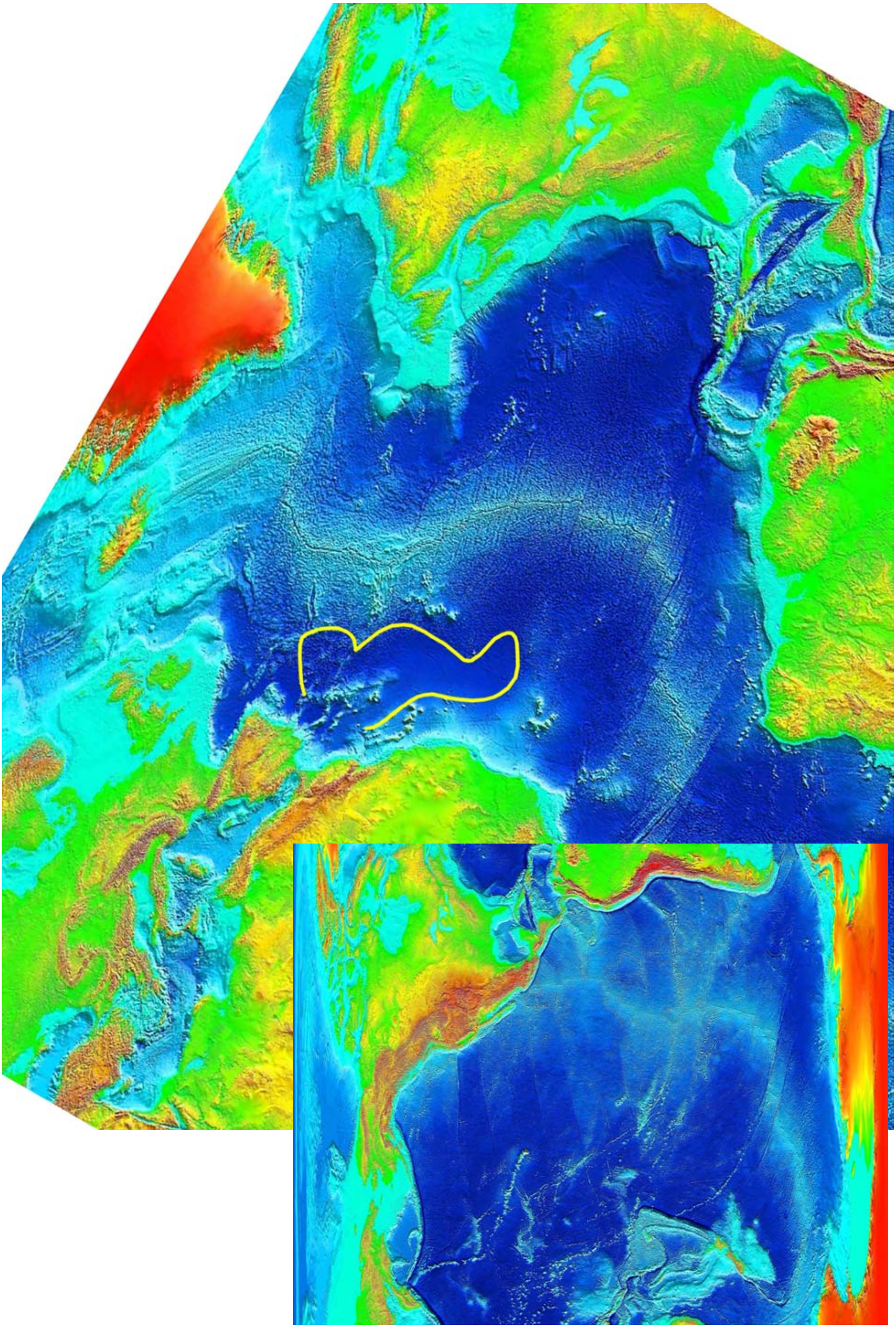

Fig. 8. In the Atlantic there is a Tycho Butterfly, analogous to the Pacific one.

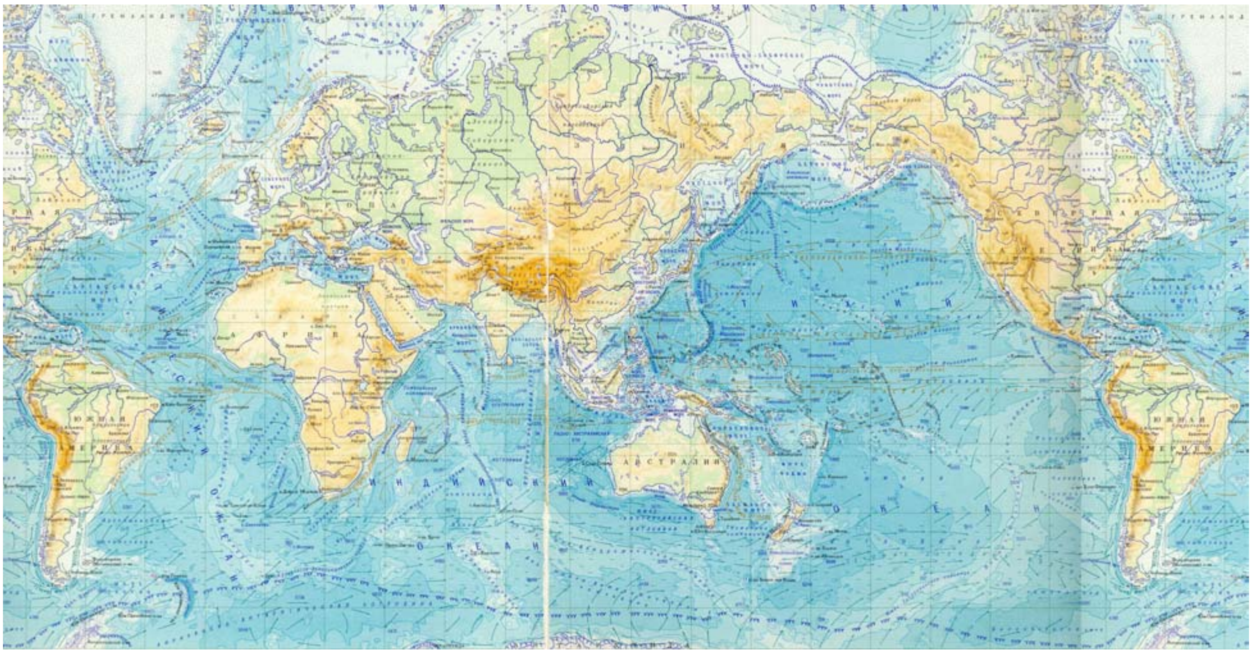

Fig. 9. The Atlantic and the Pacific Tycho Butterflies (Fig. 8) are symmetric with respect to the Indian Ocean's Tycho Crater (Fig. 10.15). They are connected by their tailes at this crater.

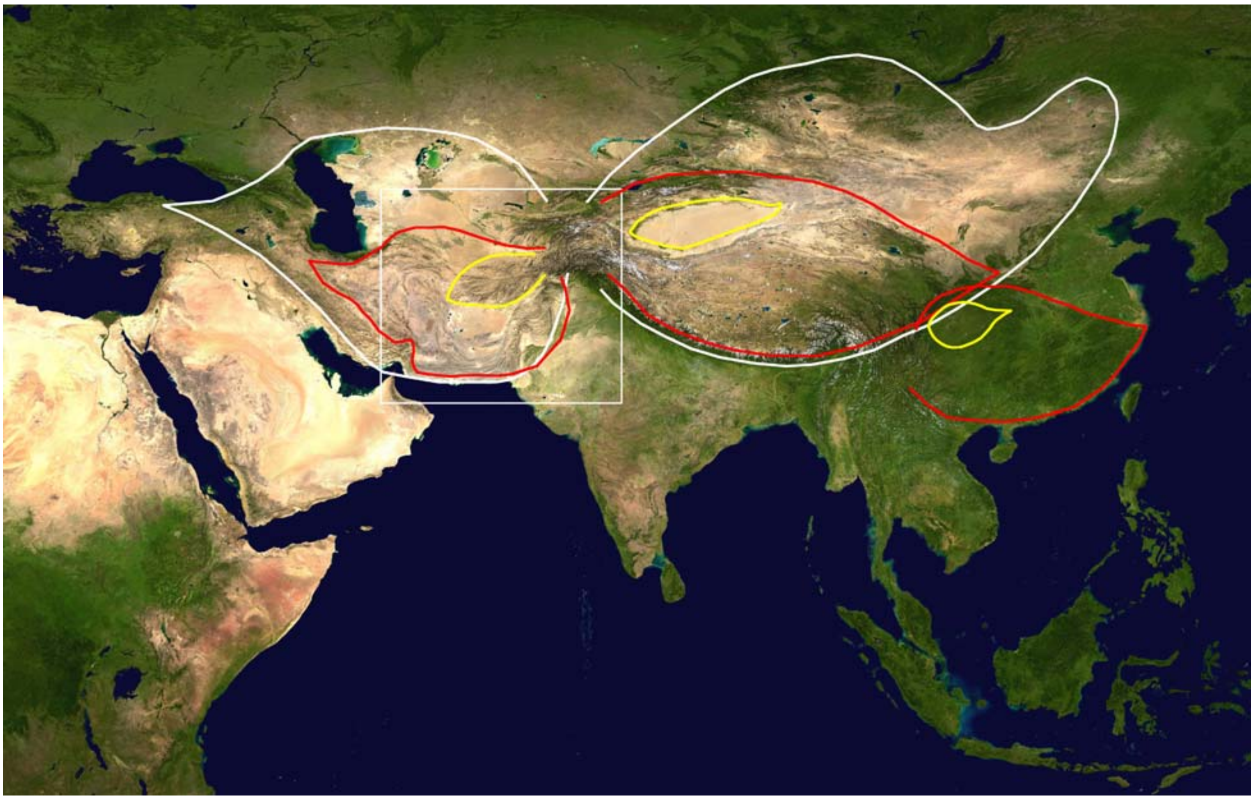

Fig. 10 Systems of enclosed petals. The petals issue from Tycho Craters. The most right red petal is placed in the local Arctic Ocean [1:5, Fig. 1-2, element 3]; the embedding of petals here is analogous to that one in Fig. 2 lower. By a frame a local Hymalayas flow (Fig. 11-12) is selected, with it's local Chukotka and Kamchatka (Indochina and Malacca).

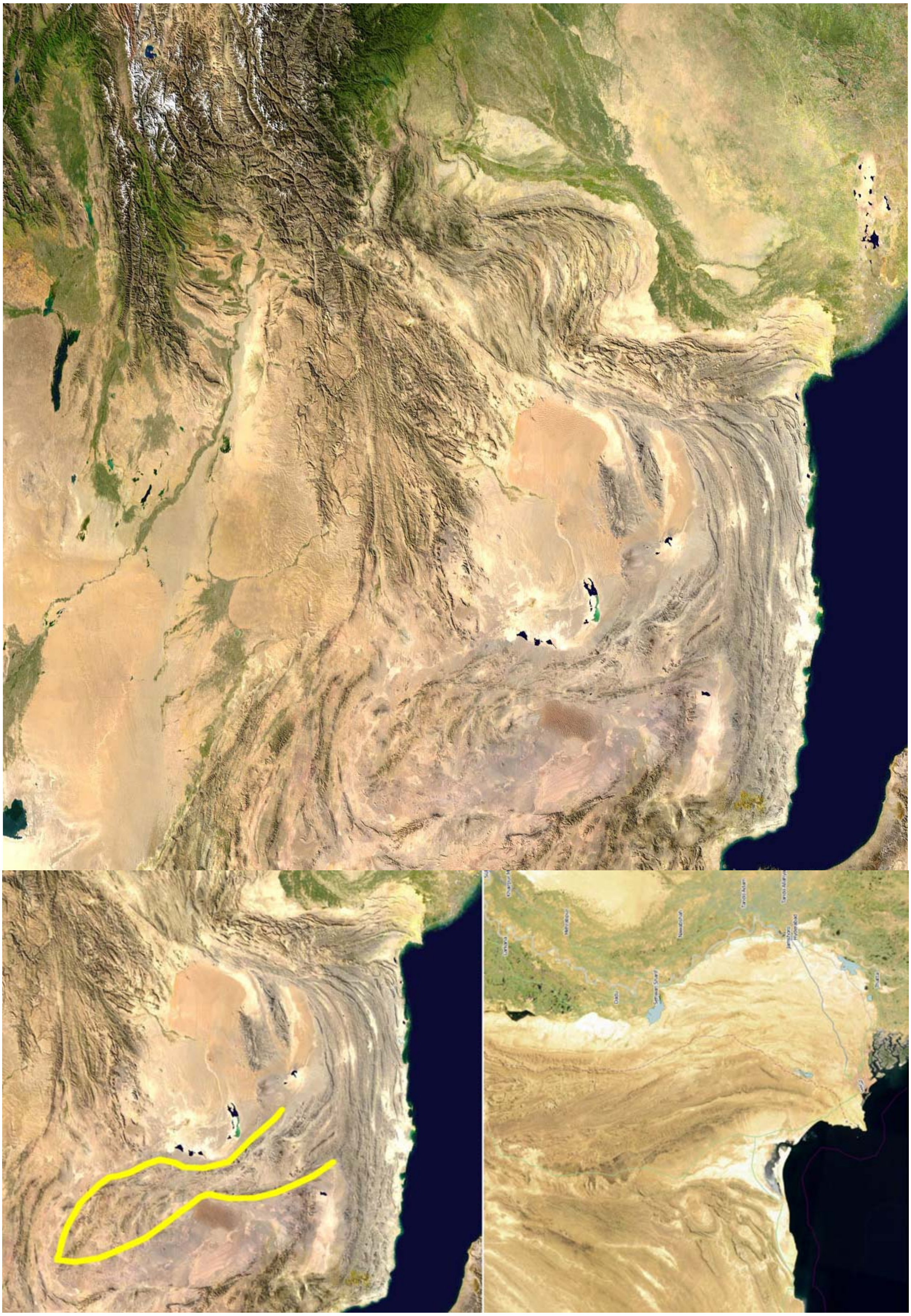

Fig. 11. A local Hymalayas flow. Turned fragment of Fig. 10. North is left. This flow is a double of the Mediterranean Sea with respect to the Hymalayas (in the sense of Fig. 11.8). Recall that the Hymalayas is a North America [1:5]. **Lower:** Malacca-Kamchatka (left) and Indochina-Chukotka (right).

Fig. 12. The petal of the Bering Sea. The root of the petal is a convex up “crater” (a mountain region).

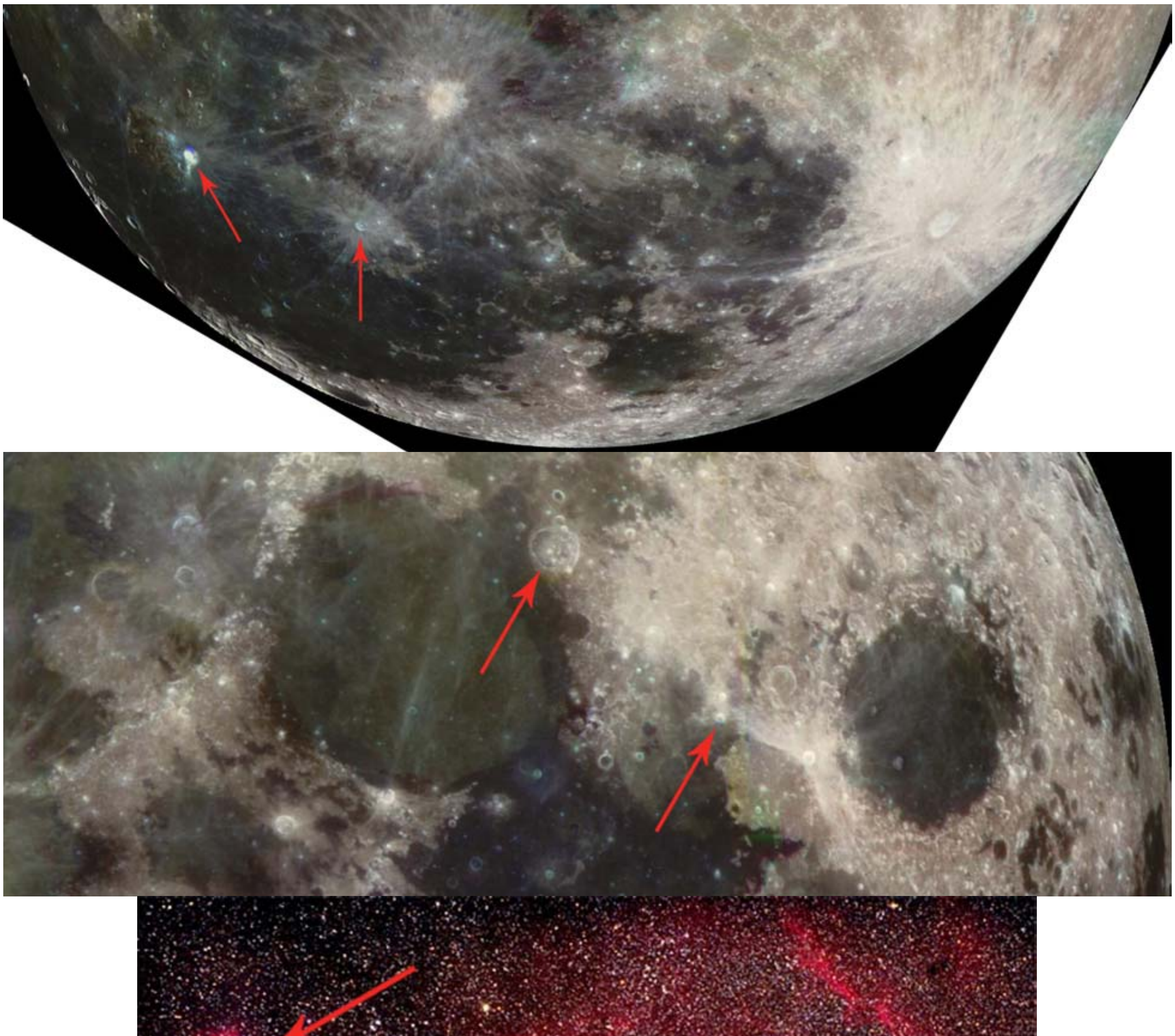

Fig. 13. Upper: The Moon, PIA00405. There are craters Kepler and Aristarchus at the prolongation of the main ray of Tycho. **Center:** The Moon, PIA00405. There are two craters at the prolongation (curved) of the main ray of Proclus. **Lower:** Eta Carinae Nebula. Image: Steve Mandel, Hidden Valley Observatory. There is a "crater" at the prolongation of the "main ray of Tycho".

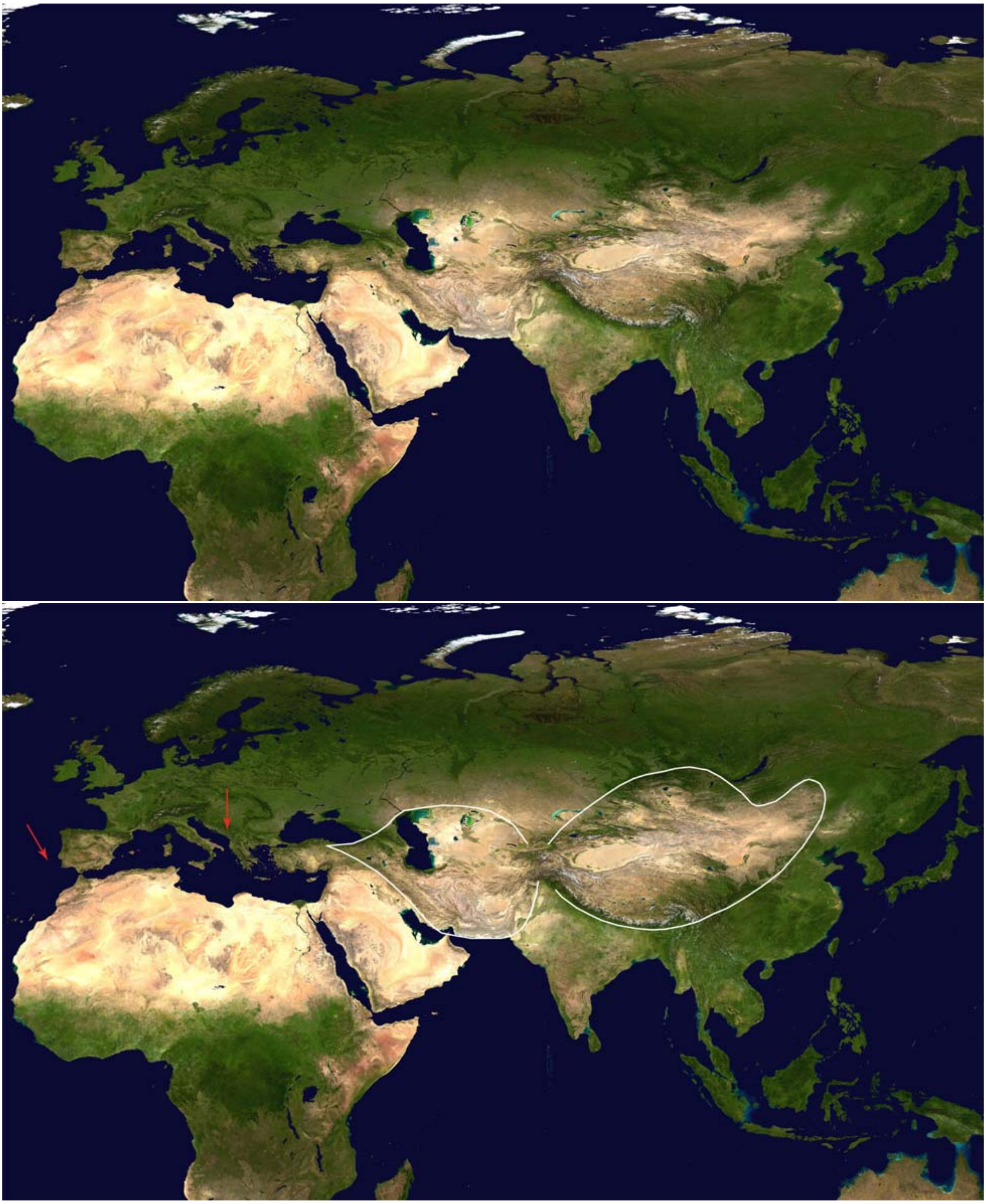

Fig. 14. The left petal of the Pamir Mountains is “the main ray of a Pamirian Tycho Crater” (Fig. 5-6). The prolongation of this ray (we take into account the curvature of the Earth) goes through the head of the Balkan Butterfly (Fig. 2 upper right; Fig. 10.16) and through the “Pamirian Tycho Crater” of the Mediterranean Sea (Fig. 4) (are pointed by arrows).

13. Mach stems and inverse cascades of turbulence

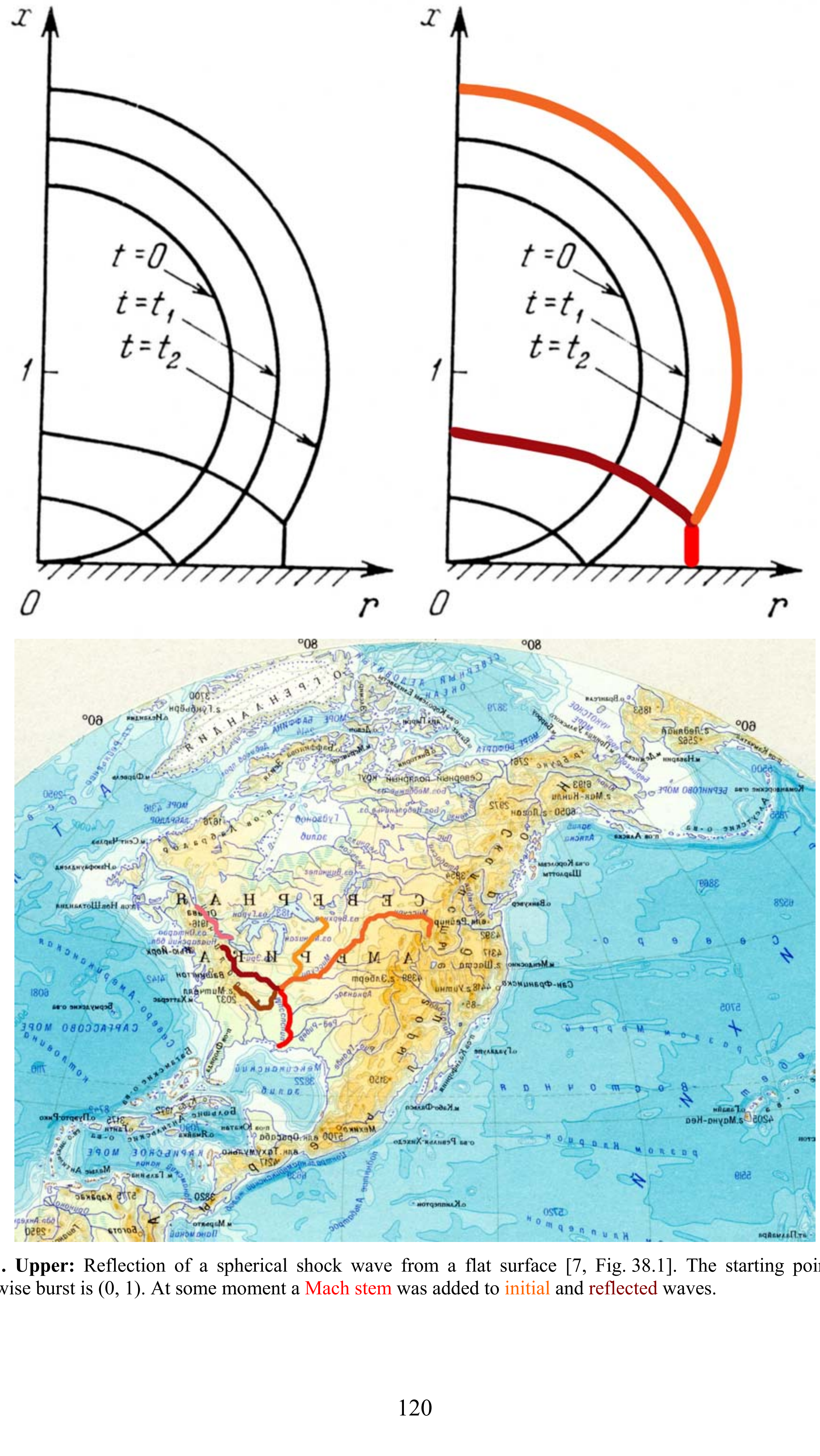

Fig. 1. Upper: Reflection of a spherical shock wave from a flat surface [7, Fig. 38.1]. The starting point of a pointwise burst is (0, 1). At some moment a Mach stem was added to initial and reflected waves.

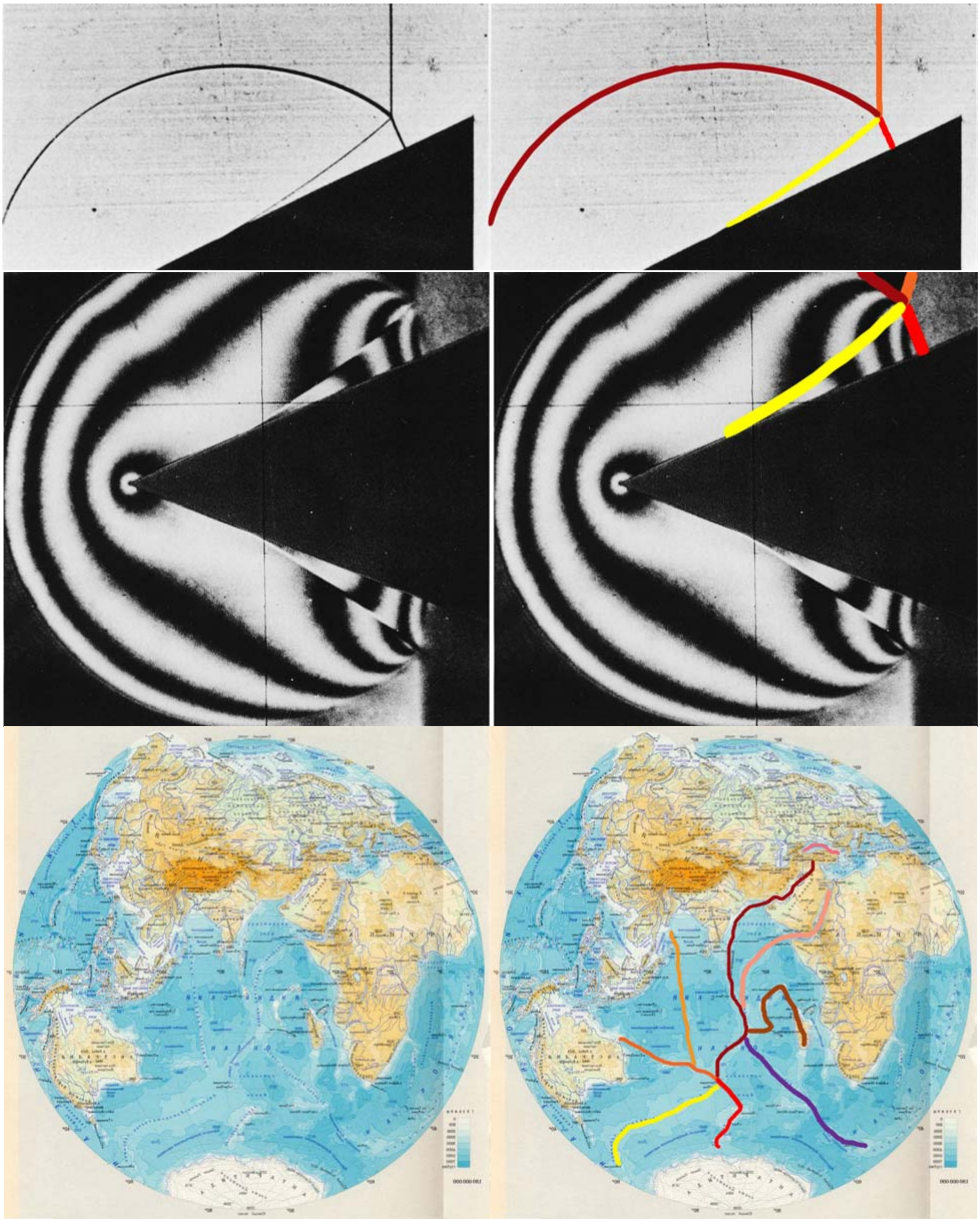

Fig. 2. Upper: The angle between the vertical shock wave and the cone surface is 65^0 (cone of half-angle 25^0) [6, Fig. 236]. The reflection of the wave from the surface is nonregular (Mach reflection), i.e. with a Mach stem. One could see a shear line, where entropy is breaking, because there are different shock waves at different sides of the line. **Center:** An interferogram with lines of constant density; cone of half-angle $22{,}5^0$ [6, Fig. 237]. There are breaks of density when crossing the shear lines. **Lower:** Yellow and violet lines of slipping grow up from their Y-points. Middle oceanic ranges are shear lines (a kind of a break), because different continents act on different sides of them (this is why the ranges are middle). Middle ranges can be considered as borders of two fluids. One could expect existence of an inverse cascad of turbulence (the Kelvin-Helmholtz instability) at the border of two fluids; see Fig. 4, 5.

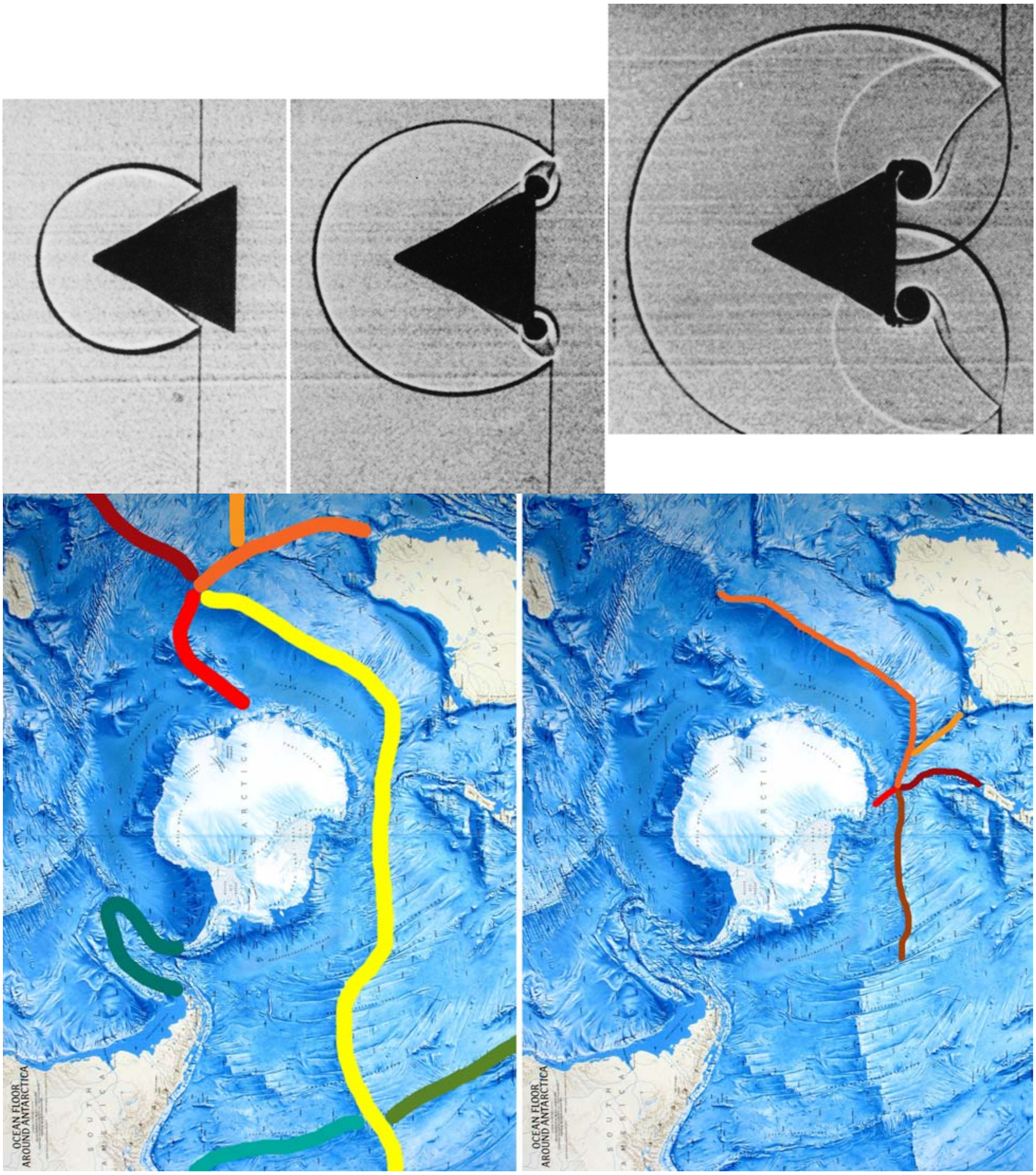

Fig. 3. Nature of a Mississippi “from a ledge” isn’t the same as nature of a Mississippi “from buttocks” at Fig. 2. In “from a ledge” case a root trunk of the Mississippi (the red curve down right) is a shear line, not a Mach stem. The true shock wave grows up “from buttocks” (the red curve down left) by the upper right foto. **Upper:** Diffraction of a shock wave on a finite wedge [6, Fig. 241]. **Lower:** Two different Mississippis grow up from Antarctida. The left figure is Fig. 7.9, the right is Fig. 5.9.

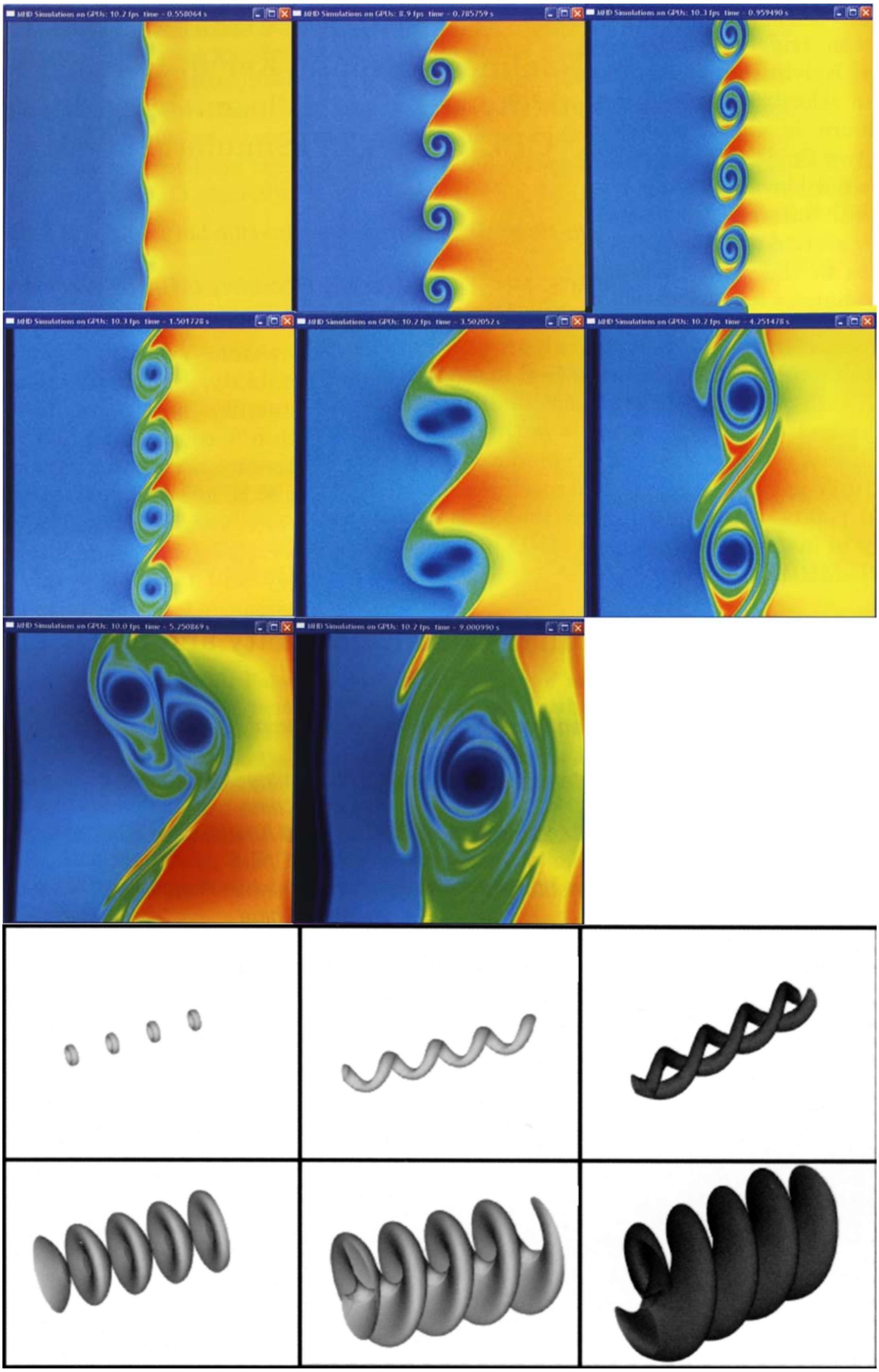

Fig. 4. An inverse cascad of turbulence (the Kelvin-Helmholtz instability) is developing from small perturbations at the interface between two fluids. **Upper:** Big vortices appear from small perturbations [8]. **Lower:** Growing of the spiral instability for three different eigenvalues (in three columns) [9].

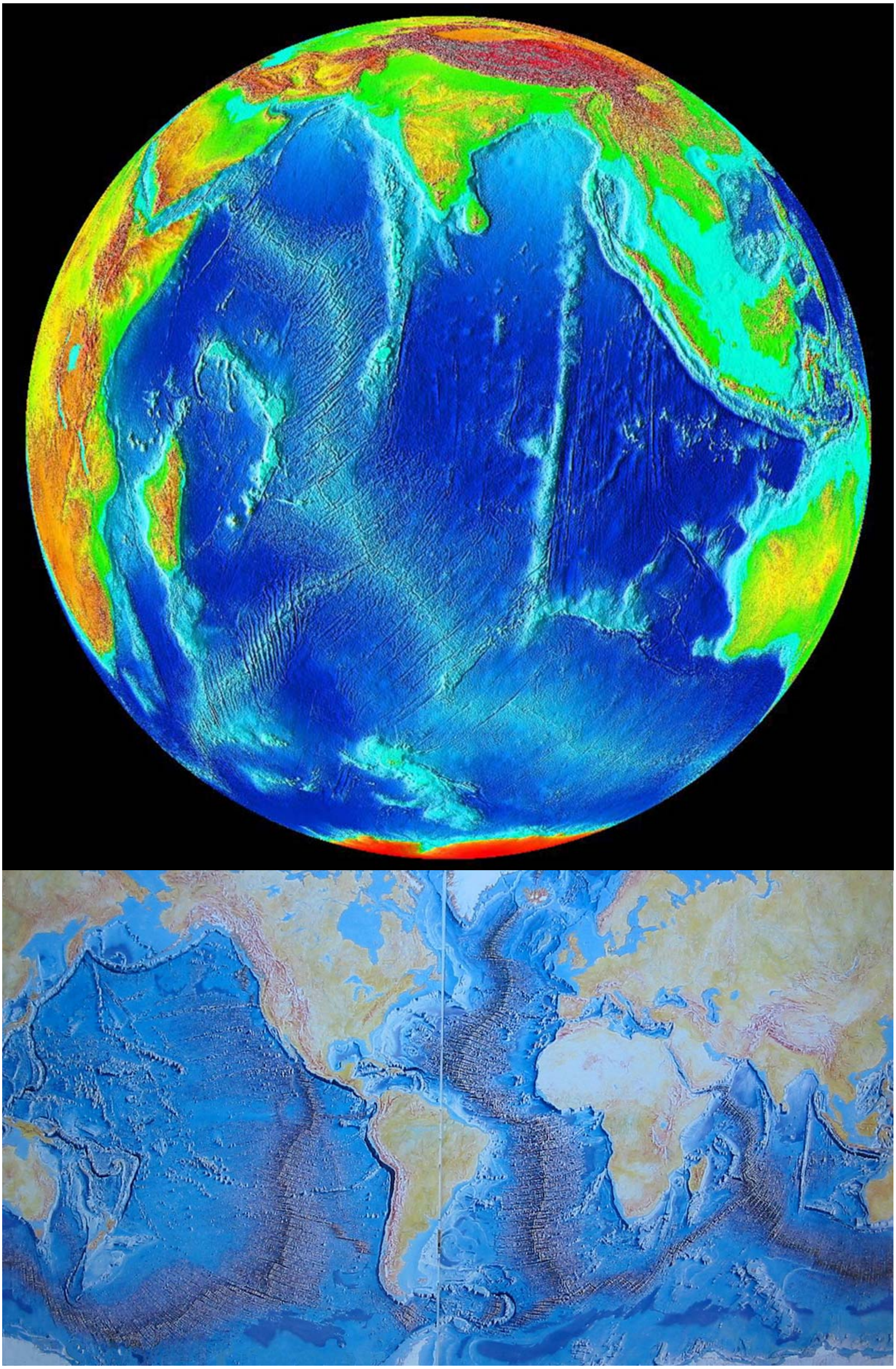

Fig. 5. There are cross-sections of the spiral instability at middle ranges of oceans (see Fig. 4 lower).

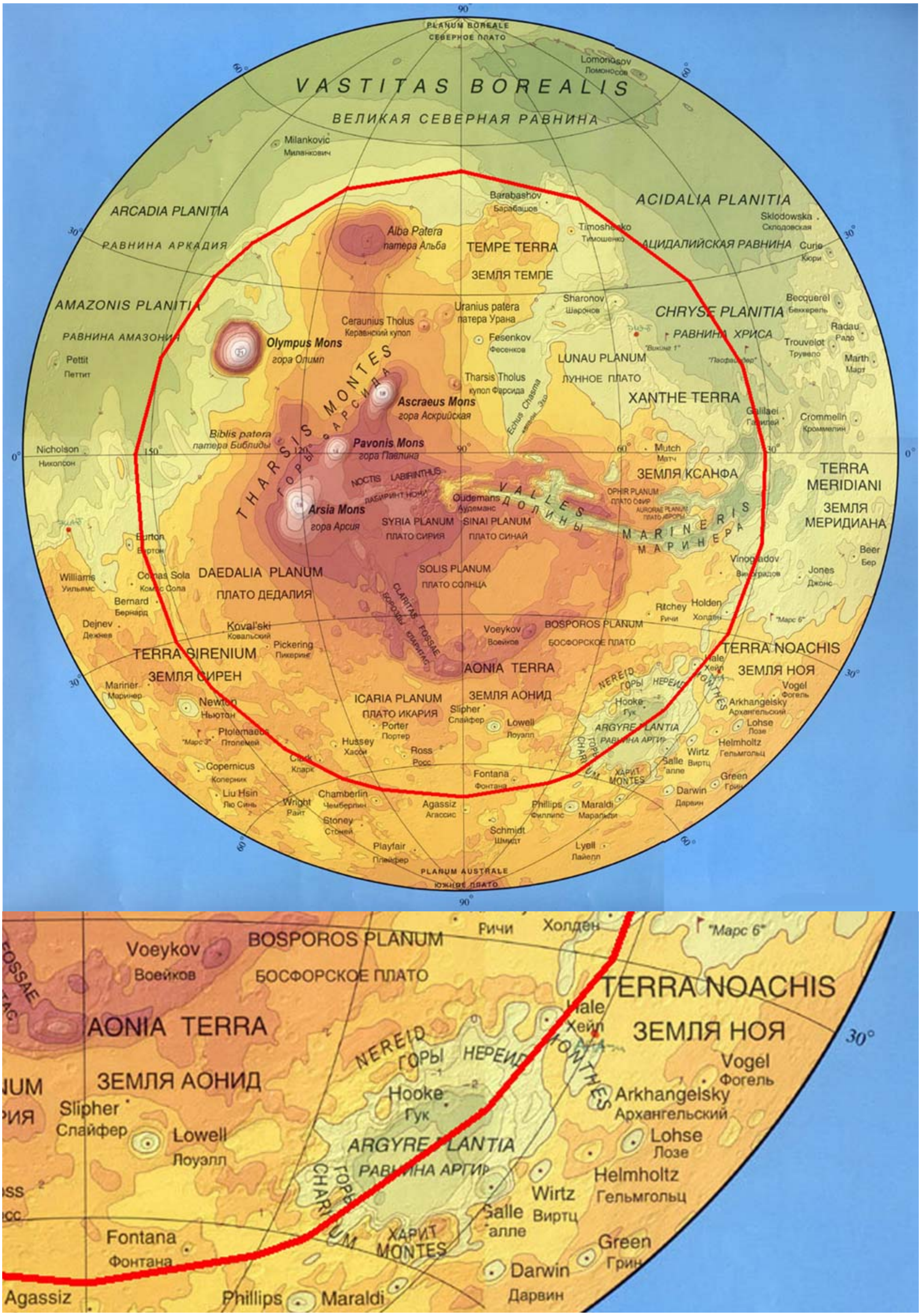

Fig. 6. North America on Mars has continental diameter (π–1) radians [1:20, Fig. 6; 1:2, Fig. 4; 1:9, Fig. 4]. The center of the red circle is (6.33^0 S, 92.2^0 W). The center of Argyre Planitia is at the red circle, i.e. Argyre is a big vortex, it is a result of developing of an inverse cascad of turbulence (see Fig. 4 upper).

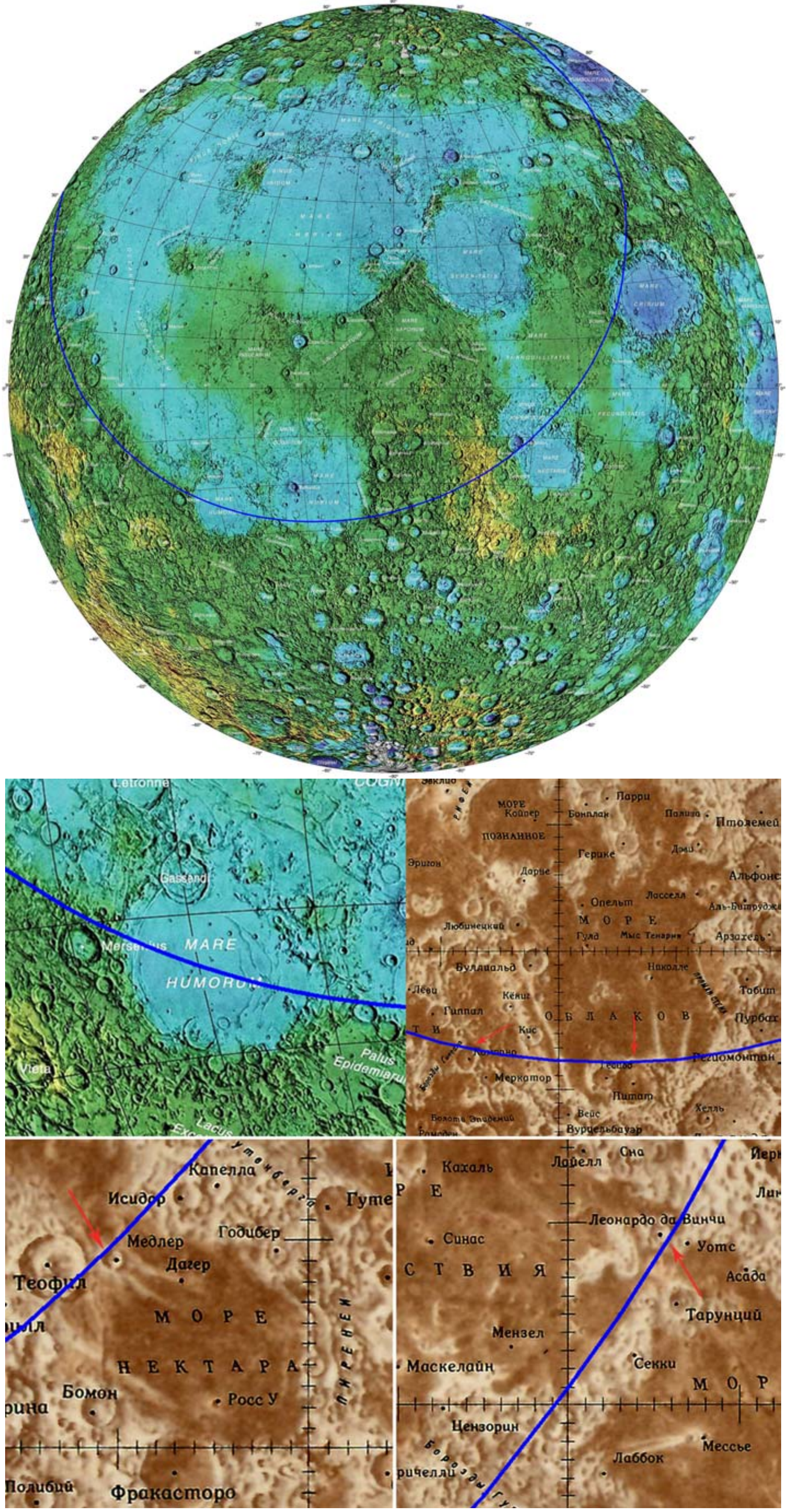

Fig. 7. The Moon. The continental basin of Oceanus Procellarum and Mare Imbrium has diameter (π–1) radians, its center is (33.25^0 N, 15.82^0 W) (the center of Mare Imbrium) [4, Fig. 6, 12-16]. The center of Mare Humorum is at the circle. The circle separates Mare Nubium and Pitatus crater (arrow), is tangent to Campanus, Mädler, da Vinchi craters (arrows), to internal basins of Mare Crisium and Mare Humboldtianum.

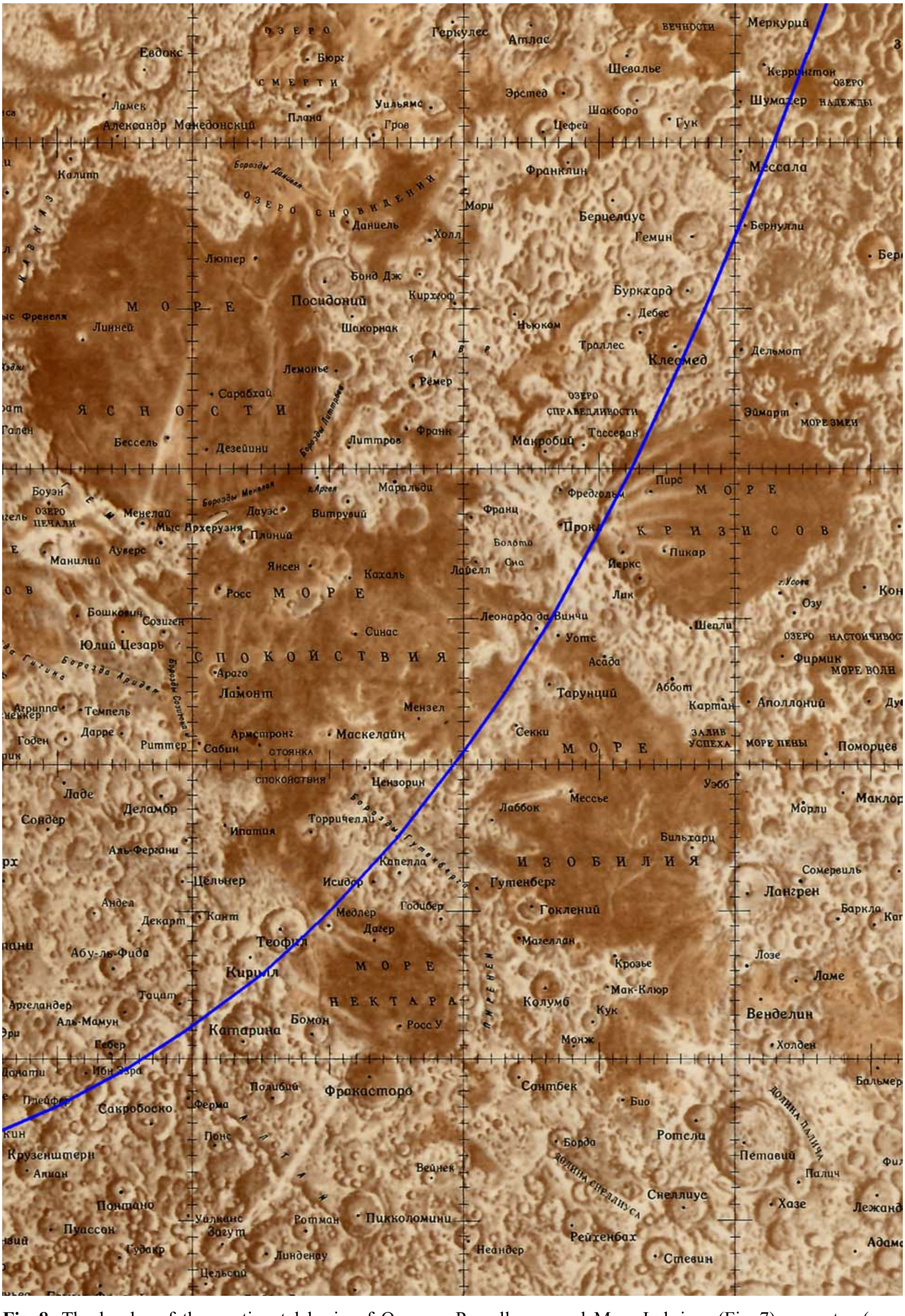

Fig. 8. The border of the continental basin of Oceanus Procellarum and Mare Imbrium (Fig. 7) separates (as a tangent line) Mare Tranquillitatis and Mare Nectaris, Mare Tranquillitatis and Mare Fecunditatis. Thus, here an inverse cascad of turbulence (see Fig. 4 upper) holds.

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