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Global Tectonics and Human Morphological Diversity

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Physical anthropology deals with various conditions of the environment and finds connections between them and physical characteristics of populations. In many cases, this approach is sufficient to explain some peculiar features of *Homo sapiens* by adaptation processes. However, ways and mechanisms of development of the major groups of the human species are still debated. Using a concept of the wave planetary tectonics and anthropometric data, the author demonstrates that there is a relationship between spatial distribution of human races and global tectonic features. The number of races corresponds to number of the main tectonic blocks differing in planetary radii. Various radii require various densities (massiveness) of individuals populating the blocks that contribute to tendency of leveling angular momentum of these blocks in the rotating planet. There are two the first-order segments: the Eastern risen continental hemisphere and the Western fallen oceanic one. The segments are comprised of tectonic sectors responsible for the development of human races. Spatial distribution of six races (Caucasian, African, Asian, Australian, Native American, and Polynesian) relate to six tectonic sectors. Physical characteristics of populations developed on these sectors tend to fulfill requirements imposed by tectonics of the rotating Earth. More gracile, less hairy, black haired and eyed peoples reside on the uplifted sectors. More massive, more hairy, light haired and eyed peoples reside on the subsided sectors. Global distributions of dolichocephalic and brachycephalic human types as well as phenomena of pygmyism and acceleration of human growth are also influenced by tectonic processes. Gradual changes in physical characteristics of a particular population occupied some region may be initialed by (a) slow changes of tectonic situation, and (b) people migration to other region marked by a different tectonic regime. Using available anthropological data on well-known anthropometric parameters, such as the Rohrer, weight-to-height, and cephalic indices, the author shows that the deep planetary structure should be considered as one of the main causes of human morphological diversity.

Keywords: wave planetology, Earth's tectonics, anthropology, tectonoanthropology, human morphology, great human races, dendrosphere.

Introduction

Existing classifications of the major groups (races) of the modern human are based on either human physical characteristics, such as skin color, hair and nose form, etc. *[Morton 1839; Topinard 1895; De Quatrefages 1896; Harrison et al. 1964; Alexeev 1974]* or genetic studies *[Bowcock et al. 1994; Risch et al. 2002]*. Physical anthropologists usually consider essential variability in human morphological types because of human adaptation to various geographical conditions (e.g., plains, mountains, and deserts), climates (i.e., cold, warm, arid, and humid), and diets *[Ranke 1894; Ratzel 1894; Harrison et al. 1964; Alexeev 1974, 1984, 1985; Alexeeva 1977, 1986; Bogin and Rios 2003; Beall 2006]*. A geological or tectonic situation commonly is out of examination. Such approach satisfactorily explained many peculiarities of human differentiation. However, ways and mechanisms of development of the major groups of the human species, racial classifications, a number of human races, and especially the existence of human races are still debated *[Alexeev 1974; Cartmill 1998; Risch et al. 2002; Biondi and Rickards 2002; Barbujani 2005]*. Indeed, a concept and classification of human races are critical issues for both fundamental investigations of the human evolution and practical (medical and forensic) studies *[Cooper and David, 1986; Gill, 1998; Risch et al., 2002]*.

The first classification of human races has been done by Bernier (*1684*) who has distinguished four groups: Europeans, African Negroes, American Indians, and Lapons. Excluding Lapons, the rest repeats itself in many following classifications. Blumenbach (*1795*) distinguished five races: Caucasian, Mongolian, Ethiopian, American, and Malay; Deniker (*1900*) — twenty nine races, Von Eickstedt (*1937*) — thirty eight races, Biasutti (*1959*) — fifty three races, Coon (*1965*) — five races: Congoid, Capoid, Caucasoid, Mongoloid, and Australoid; and Risch et al. (*2002*) — five races: African, Caucasian, Pacific Islander, East Asian, and Native American. Detailed reviews of racial classifications can be found elsewhere *[Omoto 1997; Barbujani 2005]*.

In the 18th—19th centuries, a majority of scientists made racial divisions considering morphology and languages of peoples *[Ranke, 1894; Alexeev, 1974]*. Deniker (*1900*) was the first to use human physical characteristics (distinguishing primary and secondary ones) as the basis for the racial classification. All following classifications were mainly based on human morphology, although there were attempts to use physiological data (e.g., blood groups *[Boyd 1950]*). Except for several works *[Bowcock et al. 1994; Risch et al. 2002]*, modern genetic studies do not associate racial labels with recognizable genetic clusters *[Omoto 1997; Jorde & Wooding 2004; Barbujani 2005]*, but accept that '*there is a geographic structure in human genome diversity and that it is possible to infer with reasonable accuracy the continent of origin from an individual's multilocus genotype*' *[Barbujani 2005]*. Rather small genetic contrast between main races is probably due to relative 'youthfulness' of the *Homo sapiens* species: there was no enough time for deeper differentiation with reflection in genes.

The uncertainty of the number of human races is caused by incomprehension of deep reasons of such fundamental differentiation. Superficial geographic distribution of races has to be underlined (strengthened) by deeper tectonics, forming continental and oceanic landforms. In this chapter, the author demonstrates relationships between human morphological diversity and global tectonic features using a concept of the wave planetary tectonics and available anthropometric data. In particular, tectonic data are utilized to classify human races, to analyze human morphological types, to study chemistry of human hairs, phenomena of pygmyism and acceleration of human growth, and gradual morphological changes in humans. Finally, an influence of tectonics on the global distribution of timber density is discussed to demonstrate a universal character of the tectonic control of the biosphere.

Materials and Methods

The author used available anthropological data including statistical data on well-known anthropometric parameters, such as the Rohrer, weight-to-height, and cephalic indices *[Broca 1860; Gould 1869; Ranke 1894; Quatrefages 1896; Hrdlička 1920; Weidenreich 1927; Alexeeva 1977, 1986; Gill 1998; Ruff 2002; Beall 2006]*. To describe global tectonic features, the author used his original concept of the wave planetary tectonics *[Kochemasov 1991, 1992, 1998, 1999, 2003a]*. Comparative analysis of spatial distribution of anthropometric and tectonic patterns was used as the main approach of this study.

The author also analyzed data on timber densities arranged by regions *[Brown 1980; Atrokhin et al. 1982]*. Timber density averaging was done separately for the foliage and coniferous trees as systematically lower densities mark the latter. Timbers of the tropics and moderate northern latitudes were also separately analyzed: the latter are systematically lighter as they receive less sun and precipitations.

Tectonic Background

There is a dichotomy in the global structure of the Earth. Indeed, two planetary hemispheres are marked by clear distinctions: the Eastern hemisphere is risen continental, while the Western one is fallen oceanic. Both hemispheres are naturally divided into risen continents and oceanic plateaus, and fallen oceans and oceanic basins. This rather complex tectonic pattern of the Earth is complicated by smaller tectonic 'granules' (e.g., superstructures of the Archean cratons). The author's concept of the wave planetary tectonics *[Kochemasov, 1992, 1998, 1999, 2003a]* explains this structure by an interference of warping planetary waves arisen in any planetary body due to their movements in non-circular Keplerian orbits, elliptic or parabolic. This universal movement implies cyclic changes of orbital accelerations and, as a result, an occurrence of inertia–gravity forces in any celestial body. These forces produce standing waves of four orthogonal and diagonal interfering directions in a rotating body.

The longest possible wave in any celestial body is the fundamental wave 1 of length $2\pi R$, where R is a body radius. These four interfering waves are responsible for the ubiquitous tectonic dichotomy — an opposition of two hemispheres with slightly different planetary radii: the uplifted hemisphere has longer radius than the subsided one The first overtone wave 2 of length πR produces ubiquitous tectonic sectoring, that is, risen and fallen blocks, continents and secondary oceans, correspondingly. Risen sectors include African — Mediterranean, Asian, North American, and Antarctic, while fallen sectors include Eurasian, Indoceanic, Pacific, and South American (**Figure 1**). These sectors are grouped around six vertices of a structural octahedron (**Figure 1**). On Earth, octahedron vertices form three antipodean pairs (**Figure 1 a, c**): Equatorial Atlantic — New Guinea (1—2), Pamir — Hindu Kush — Easter Island (4—3), and Bering Strait — Bouvet Island (5—6).

The octahedron structure inversely relates to the topography of the core–mantle boundary (**Figure 1b**): an uplift of the crust, as a rule, corresponds to a depression of the core surface and, vice versa, a crustal subsidence generally corresponds to an uplift of the core surface. A projection of the octahedron faces and edges on the Earth surface form sectors and their borders, correspondingly (**Figure 1c**). Actual sectoral border deviate from ideal projections of the octahedron edges due to the Earth's rotation ellipticity and warping waves of other lengths.

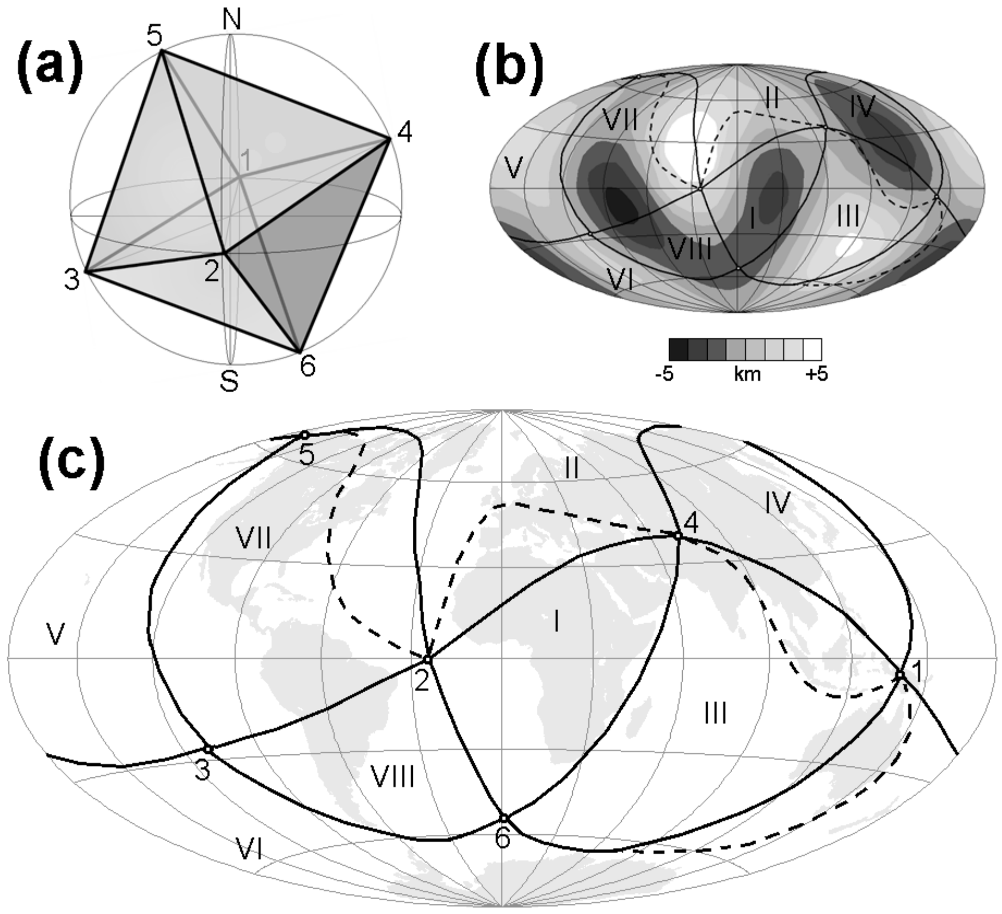

Figure 1. Tessellation of Earth: (a) terrestrial octahedron *[Kochemasov 2001]*; (b) correlation of the core topography *[Morelli and Dziewonski 1987]* with the projection of the terrestrial octahedron; (c) terrestrial octahedron projected on the Earth surface. Octahedron vertices: 1— New Guinea, 2 — Equatorial Atlantic, 3 — Easter Island, 4 — Pamir — Hindu Kush, 5 — Bering Strait, and 6 — Bouvet Island. Sectors: I — African–Mediterranean, II — Eurasian, III — Indoceanic, IV — Asian, V — Pacific, VI — Antarctic, VII — North American, VIII — South American. Solid and dotted lines are ideal and distorted sectoral borders, correspondingly. The Earth's core and surface are presented in proportional scales.

Different orbital frequencies of celestial bodies are responsible for warping waves whose lengths are inversely proportional to these frequencies: the higher frequency the smaller wavelength, the lower frequency the larger wavelength. Tectonic granules are produced at intersections of these waves. Thus, granule sizes are inversely proportional to orbital frequencies. For terrestrial planets, there is the following range of granule sizes: Mercury — $\pi R/16$, Venus — $\pi R/6$, the Earth — $\pi R/4$, and Mars — $\pi R/2$. Risen 'positive' and fallen 'negative' tectonic blocks (segments, sectors, and granules) are tied in one rotating body. Therefore, they should have equal or, at least, similar angular momenta: the product of a block's mass by its radius (a distance to the axe of rotation) and a square of an angular speed of rotation. Otherwise, a body will tend to fall apart. Since all tectonic blocks of a celestial body have the same angular speed of rotation, there should be the interplay between radius and mass. To equilibrate block angular momenta, the sectors and sub-sectors having shorter or longer planetary radii should have larger or smaller masses (densities), correspondingly. This requirement is fulfilled in the solid Earth by means of rocks of different masses and densities and an adjustment of the inner geospheric boundaries. Subsided ocean floors are filled with dense basic rocks — gabbroids and basalts; the Moho and the core–mantle boundaries are uplifted. Uprising continents are built with generally less dense andesitic material; the Moho and core–mantle boundaries are subsided.

A difference in appearance and structure of tropical and extratropical zones of various celestial bodies, such as terrestrial planets, gas giants, and icy satellites, sets one to look for a common reason of this phenomenon. All celestial bodies rotate, and their spherical shape makes zones with different angular momenta at different latitudes, since a distance to the rotation axis diminishes gradually from the equator to the poles. One of remarkable changes occurs at tropics. A single rotating planetary body tends to equilibrate angular momenta of its tectonic blocks activating mechanisms, which level this basic physical property of the body. As a result, the crust tends to be destroyed, sunk, subsided, and shrunk at tropical zones. A density of the crust material changes, and an atmosphere changes its chemistry and structure there. However, mechanisms of an opposing tendency also begin to act according to the Le Chatelier's Principle: 'disturbance of a system at equilibrium causes an opposing reaction in the system' *[Hatta, 1987]*.

On Earth, the wide tropical zone is marked by destruction of the crust. This is supported by development of numerous islands of the Malay Archipelago between Southeastern Asia and Australia. In Africa and South America, there are huge depressions of the Congo and Amazon Rivers, where the Archean crust is subsided to depths of more than 2 km. In the Pacific, numerous islands of Micronesia occur along the equator. An intensive folding and faulting of basalt and sedimentary layers follows subsidence of the basaltic oceanic crust, as a larger mass should be held by a smaller space (because a planetary radius is diminished). In the Central Atlantic, there are huge transform fault zones giving way to more quite tectonics to the north and south, where basaltic effusions form large provinces. This addition of dense basalts to the crust increases angular momentum of the extratropical blocks.

All considered wave warping can be generalized by five theorems of the wave planetary tectonics *[Kochemasov 1992, 1998, 1999, 2003a, 2008]*:

1. Celestial bodies are dichotomous.
2. Celestial bodies are sectoral.
3. Celestial bodies are granular.
4. Angular momenta of different level blocks tend to be equal.
5. A rotating celestial body tends to equilibrate angular momenta of tropical and extratropical zones by regulating their masses and distances to the rotation axe.

The fourth and fifth theorems are so strict that all geospheres of a particular block or zone participate in fulfillment of their requirements: the core, mantle, crust, hydrosphere, and atmosphere. The biosphere, one of the geospheres, also participates. This will be demonstrated in next Sections.

Classification of Human Races

There are four tectonic sectors in the Eastern continental hemisphere *[Kochemasov 1991]*. These sectors are formed by an intersection of two planetary zones of the crust weakness and destruction marked by the northwestern (Alpine-Indonesian) and northeastern (African-Chukotkan) directions. The intersection occurs at the Pamir — Hindu Kush mountain massif *[Kochemasov 2003b]*, one of the six vertices of the Earth's structural octahedron (**Figure 1**).

There are four sectors joining at the Pamir — Hindu Kush (**Figures 1c and 2**):

1. A highly uplifted African–Mediterranean sector;
2. A moderately uplifted Asian sector;
3. A moderately subsided Eurasian sector; and
4. A strongly subsided Indoceanic.

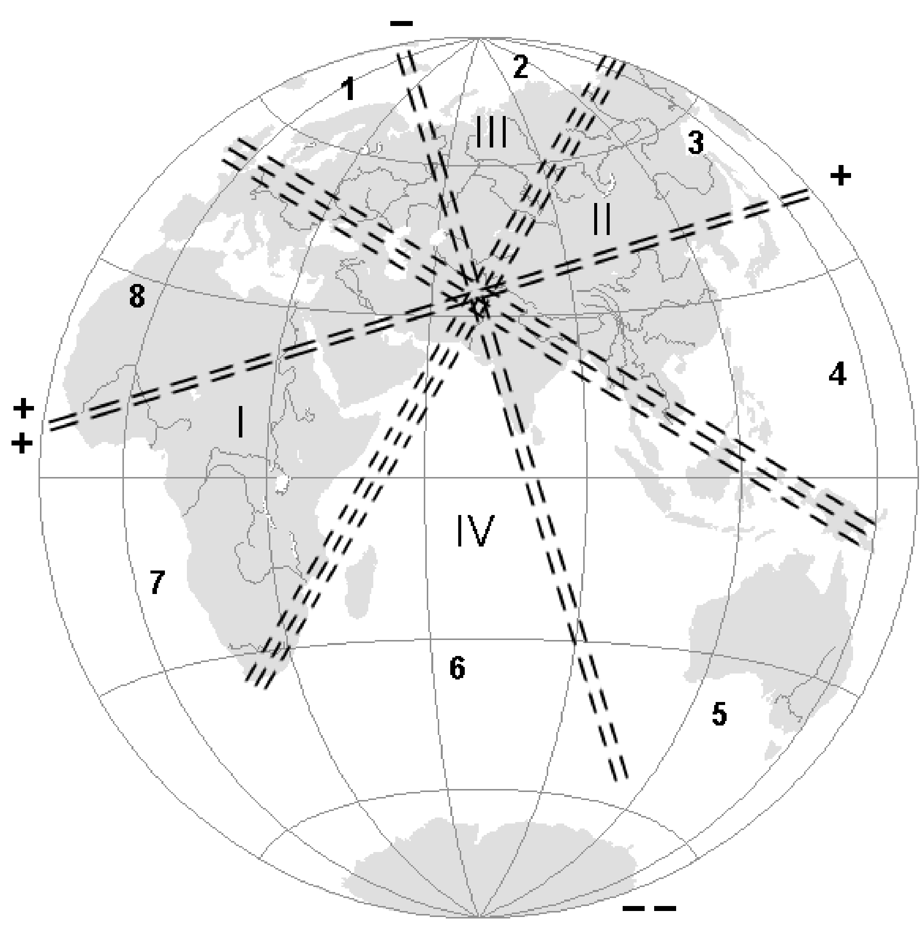

Figure 2. Sectoral structure of the Eastern hemisphere *[Kochemasov 2003b]*. Signs 'plus' and 'minus' denote uplifted and subsided (sub)sectors, correspondingly. A single sign denotes moderate vertical movement, while double sign marks enhanced vertical movement. Triple and double lines are sectoral and subsectoral borders, correspondingly. Sectors: **I** — African–Mediterranean, **II** — Asian, **III** — Eurasian, and **IV** — Indoceanic. Subsectors: **1** — East European, **2** — West Siberian, **3** — East Siberian, **4** — High Asian, **5** — East Indoceanic, **6** — West Indoceanic, **7** — African, and **8** — Mediterranean.

Each sector is divided into two sub-sectors by a tectonic bisector. For example, the Eurasian sector is divided by the Ural Mountains (**Figure 2**). Sub-sectors are also differing tectonically and hypsometrically (uplifted and subsided) and have their inverse counterparts in the opposed sectors (subsided and uplifted, correspondingly). This regular tectonic pattern is a result of an interference of the inertia–gravity lithosphere waves of four directions (see Section 'Tectonic background').

Sectors and sub-sectors having shorter or longer planetary radii should be marked by larger or smaller masses to equilibrate block angular momenta. All geospheres — solid, liquid, and gaseous — participate in this regulation. The biosphere is no exception. Contribution of the anthroposphere consists in differentiation of physical characteristics of humans according to tectonic characteristics of sectors and sub-sectors. One of these physical characteristics is human's mass or 'density' usually expressed as the Rohrer index (weight in kg)/(height in m^3), or the weight-to-height index (the unit is g/cm) *[Cogill 2003]*.

The African–Mediterranean highly uplifted sector (mainly its southern African sub-sector, which is even more uplifted) is populated by several varieties of the African, or Negroid race comprising peoples and tribes of various stature (high, medium, and low) with dark skin and eyes, full lips, short and wide nose, long head, woolly hairs, and low hairiness. Africans generally have lesser weight and height and, hence, a low massiveness than the world average ones: the Rohrer index is 1.2—1.3 and the weight-to-height index is 300—350 g/cm *[Ranke 1894; Harrison et al. 1964; Alexeeva 1977]*. Exceptions are several East African tribes with very tall but slim stature, such as Maasai, Dinka, Shillouk, Nuer, Anuak, and Tutsi, developed on the East African prominent bulge. A big part of the northern lower Mediterranean sub-sector of the African–Mediterranean sector is populated by the southern Caucasians bearing some typical African features.

The Asian uplifted sector is populated by many varieties of the Asian, or Mongoloid race marked by dark and light yellow and brownish skin, short and wide nose, brachy- or mesocephaly, in some places dolichocephaly, strait thick hairs, and low hairiness. They usually have low or medium stature and medium weight, and, hence, their average Rohrer index is not very high ranging from 1.3 to 1.4 *[Alexeeva 1977]*. A very large area occupied by this major group and its transition eastward to the Western subsided hemisphere lead to the natural division of the type in two principally distinct populations: continental varieties in the west and Pacific ones in the east. The latter are more massive, with the Rohrer index ranges up to 1.4—1.5. An inequality exists also in the south–north direction between two sub-sectors. It is so distinctive that Legendre (*1913*), having studied Chinese for 20 years, came to a non-serious conclusion that there is no yellow race at all, as the northern Chinese are like Caucasians (Assiroids), while the southern ones are like Africans. From the author's point of view, there is much truth in this observation: in terms of the uplifting level, the higher southern sub-sector of the uplifted Asian sector is close to the African sector, while the northern relatively low sub-sector is close to the subsided Eurasian sector. Populations, developing on the uplifted blocks, acquire African characteristics (i.e., lower massiveness), while populations, developing on subsided blocks, acquire Caucasian characteristics (higher massiveness).

The subsided Eurasian sector is populated by many varieties of the Caucasian, or Europeoid race. The sector is clearly recognized on physiographic maps by its mainly green color of plains surrounded by brown colors of the mountain regions in the south and east. Generally, Caucasians have a light skin, thin lips, long narrow nose, brachy- and dolichocephalic heads. Their hairs are dense, thin, curly, and as eyes light and dark. The hairiness is strong and very strong. The population of the Eurasian sector is generally tall and massive. However, its Rohrer index is not extremely high (1.3—1.4) due to an elevated height *[Alexeeva 1977]*. An inequality exists between the sub-sectors divided by the meridian chain of the Ural Mountains. The eastern West Siberian sub-sector is more subjected to an Asiatic influence, but the paleoanthropological data testifies that Caucasians have populated it in the past *[Débetz 1961; Dennell 2008]*. In the south, Caucasians cross the sector boundary, and in the Mediterranean region acquire some features of the Africans, such as the darker skin and eyes, more curly hairs, and less massiveness than the northern Caucasians.

The Australian race includes Australian Aborigines, Veddas, Veddoids (Proto-Australoids), Dravidians, and Sinhalese originally populated the strongly subsided Indoceanic sector *[Ranke 1894; Ratzel 1894; Harrison et al. 1964; Alexeev 1974]*. All of them are dark skinned and eyed and have an increased hairiness. The head hairs are curly and soft curly. The stature is always tall in Australia and some parts of India, but Veddas and Veddoids of near equatorial regions are short. An increased stature of Australian Aborigines (and desert conditions?) makes their Rohrer index non-high (however, it is high in some tribes). In India, the Rohrer index is very low (1.2—1.3 *[Alexeeva 1977]*) and this was not properly explained. One may suppose that this is due to development of the population on the uplifted Indian sub-continent (a part of a tectonic grain) though in the limits of the subsided sector. (More solid reason is in development of the Indian populations in limits if the Indian geoid minimum with low gravity making people less massive). An acquirement of some African features is clearly seen in aborigines of the uplifted block of Australia (a tectonic grain), also within the Indoceanic subsided sector: they are very dark, with thick lips, and extremely long-headed. We should mention that although they have dark hair, their children often have light hairs *[Harrison et al. 1964]*. Along with tall stature, very pronounced hairiness and curly hairs nears Australians to Caucasians of the opposite and subsided sector (**Figure 2, 3**).

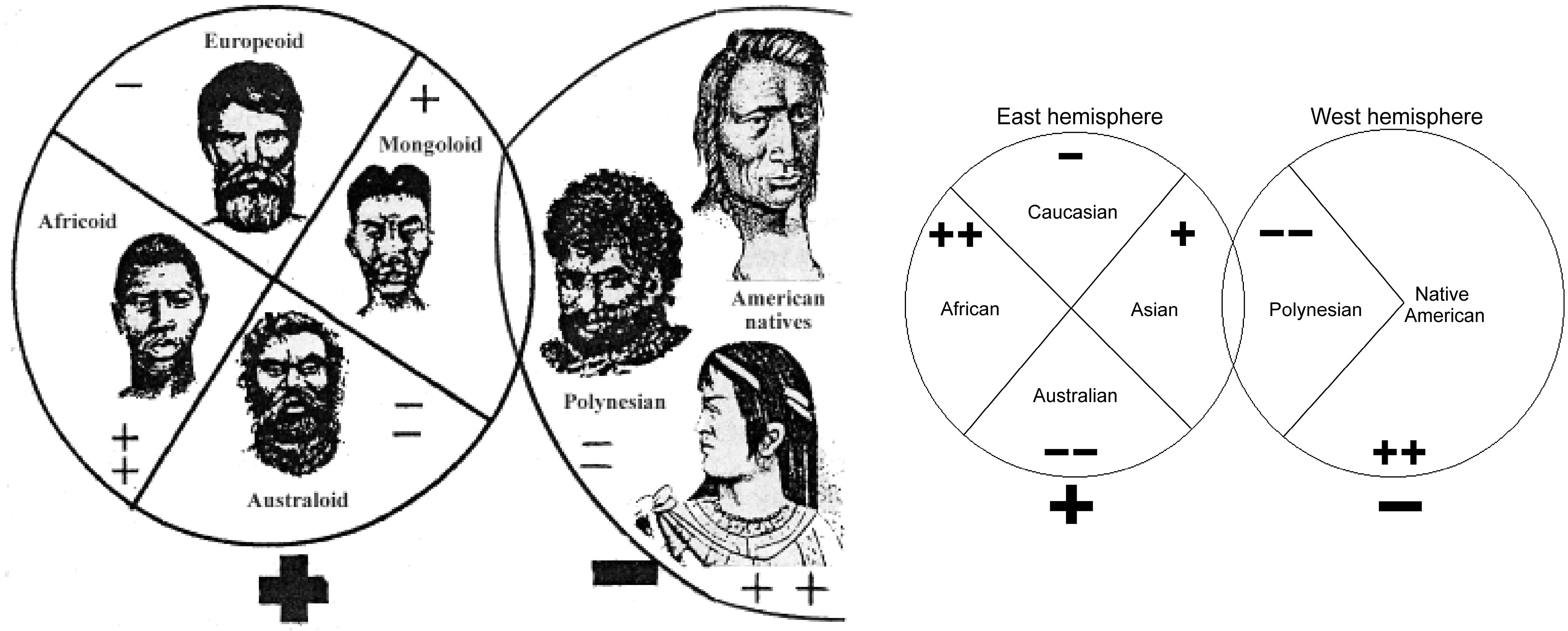

Figure 3. Diagram illustrating the classification of human races considering global tectonic features. Continental and oceanic segments are denoted by big signs 'plus' and 'minus', correspondingly. Uplifted and subsided tectonic sectors are labeled by smaller signs 'plus' and 'minus', correspondingly. A single sign denotes moderate vertical movement, while a double sign marks enhanced one.

Therefore, spatial distribution of four human races of the Eastern continental hemisphere relate to four tectonic sectors (**Figure 3**). The physical characteristics of population developed on these sectors tend to follow requirements imposed by tectonics of the rotating Earth. More gracile, less hairy, black haired and eyed peoples reside on the uplifted sectors. More massive, more hairy, often light haired and eyed peoples reside on the subsided sectors. Below the author shows that the difference is not only in the hair color but also in hair composition: hairs are more ferruginous and so denser in the lower Eurasian sector than in the uplifted Asian one.

Sectoring of human major groups around the Pamir — Hindu Kush vertex is not unique for the Earth. The New Guinea sectoral structure (**Figure 4**) is the other example of the regularly formed wave sectors, but with much distorted, non-rectilinear boundaries due to a superposition of boundaries of segments and sectors (structures of different spatial scales). Nevertheless, there is an opposition of two uplifted sectors separated by two opposed subsided ones there (**Figure 4**). Physical characteristics of populations on these sectors reflect their tectonic position as in the previous cases. At the risen center — the New Guinea Island — there are the Papuans having many African traits. The Malays, Filipinos, and Negritos occupy the northwestern uplifted sector, while Melanesians occupy the southeastern uplifted sector. Micronesians and Polynesians occupy the northeastern subsided sector, while Australian Aborigines and Veddoids occupy the southwestern subsided sector. The tectonic influence on human morphology is not violated again: risen terrains are occupied by populations with African or Asian tendencies, while fallen blocks — by populations with Caucasian affinities.

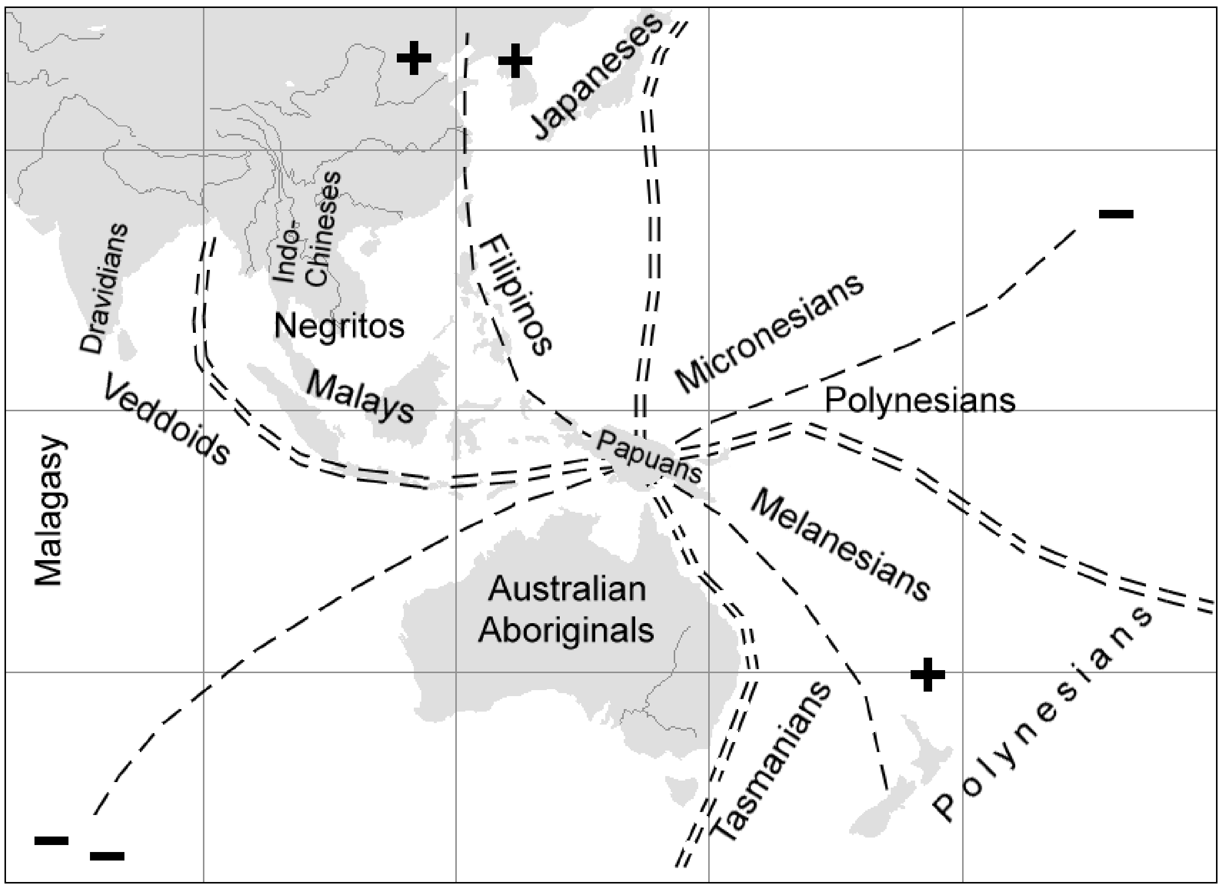

Figure 4. The New Guinea sectorial structure. Double and single lines are sectorial and subsectorial borders, correspondingly. Signs 'plus' and 'minus' denote uplifted and subsided sectors, correspondingly. A single sign denotes moderate vertical movement, while double sign marks enhanced vertical movement. Sectorial borders are distorted due to position of this sectorial structure in the transition zone between continental and oceanic segments.

The examples discussed above are mainly concerned with the Eastern uplifted continental hemisphere populated very earlier, a few hundred thousands or so years ago, when *Homo sapiens* has begun to settle the Earth migrating from Africa *[Bowcock et al. 1994; Dennell 2008]*. A few ten thousand years ago, human has started to populate Americas. Then, human migration from Asia to Oceania has been initiated 3,000—4,000 years ago. Settlers have met various tectonic situations, including risen young continents and the deepest oceanic depression. Peoples have formed themselves according to tectonic characteristics. The Western subsided oceanic segment made new settlers generally more massive *[Gould 1869; Ranke 1894; Alexeeva 1977; Ruff 2002; Kochemasov 2004b]*. That is why 'young' Native Americans and Polynesians have a higher Rohrer index than the 'old' population of the Eastern risen segment. For Aleutians and Polynesians, it may be as great as 1.5 *[Alexeeva 1977; Ranke 1894; Ratzel 1894; Shapiro 1942]* that astonished scientists unable to explain this. Polynesians, especially tall and massive, even obese, have been considered as lazy people *[Ranke 1894]*, or as especially stout people survived after long hungry sea voyages when meager persons were dying *[De Quatrefages 1864]*. Considering the concept of wave planetary tectonics, it is possible to explain correctly the phenomenon of increasing massiveness of populations of the Western oceanic hemisphere *[Kochemasov 2004b, 2006a, 2006b]*.

All 'young' settlers of the Western subsided segment acquire some features of Caucasians of the subsided sector. Naturally, this transformation is much more pronounced in the deepest Pacific oceanic depression, where the southeastern Asians, originally short, with epicanthus, strait black hairs, and poor hairiness, became tall, massive, with curly (frizzy) hairs, and moderately bearded *[Quatrefages 1864; Howells 1933; Shapiro 1942]*. Their hairs are black and brown but their children, for example, in Tahiti, are much more light; inhabitants of some islands also have rather light hairs *[De Quatrefages 1864]*. Natives of both Americas — the risen blocks — keep many features of their Asian ancestors but have lost epicanthus, gain stature (North American Natives and Patagonians), and massiveness; some of them are bearded and curly as at the North-western coast of Canada.

Thus, there is correspondence between basic tectonic blocks of the Earth and their inhabitants belonging to different human biological races. From this standpoint, it seems strange that inhabitants of the greatest Pacific oceanic depression (one third of the terrestrial surface!) were not usually considered as an independent race. Although Polynesians bear many traits of other races, a combination of their morphological characteristics is unique, making them the sixth human race (this fact was previously noted but did not received much attention *[Gill 1998; Risch et al. 2002]*). Polynesians present one of the best examples of transformation of human physical characteristics under influence of tectonic environment for rather short period (ca. 2,000—4,000 years).

Six human races (Caucasian, African, Asian, Australian, Native American, and Polynesian) can be divided in two trunks: conventionally 'continental' (Caucasian, African, Asian, and Australian) and 'oceanic' (Native American and Polynesian) populating the Eastern and Western hemispheres, correspondingly (**Figure 3**). Relatively short period of development of the oceanic trunk explains why it was not further differentiated into more races. However, the process is in progress as the northern and southern Native Americans are already marked by important differences, such as stature and cephalic index: the northern Native Americans are taller and shorter-headed *[Pestryakov & Grigoryeva 2004]*. 'Younger' Polynesians even more had no time for deeper morphological differentiation, though a beginning of the process could be noted (differences in stature and cephalic index are observed). It should be mentioned that the first settlers in Pacific, coming from continental 'highs', were longer-headed as paleosculls of Polynesians and Aleutians demonstrate *[Hrdlička 1939; Shapiro 1942]*. Polynesian myths talk us about the first settlers of very low stature called *menahune* and being good builders of stone structures. To this we should add very important observation: a genetic distance between human races increases with time *[Nazarova 2005]*.

Dolichocephaly and Brachycephaly

In the global tectonics, the deepest Pacific oceanic depression is antipodean to the highly uplifted African continent. This should be reflected by density of substances composing tectonic blocks (see Section 'Tectonic background'). This physical requirement concerns all geospheres *[Kochemasov 2007]*. In the crust of the Pacific depression, dense basic rocks of basaltic affinity prevail, while the African crust is built by much lighter rocks of granitic affinity. In the anthroposphere, 'old' population of Africa is mainly characterized by less massiveness and medium or short stature (the weight-to-height index is 300—350 g/cm). In Pacific, numerous islands are populated by 'young' Polynesians, tall and massive peoples (the weight-to-height index is 350—450 g/cm) that differs noticeably from the physical characteristics of Africans.

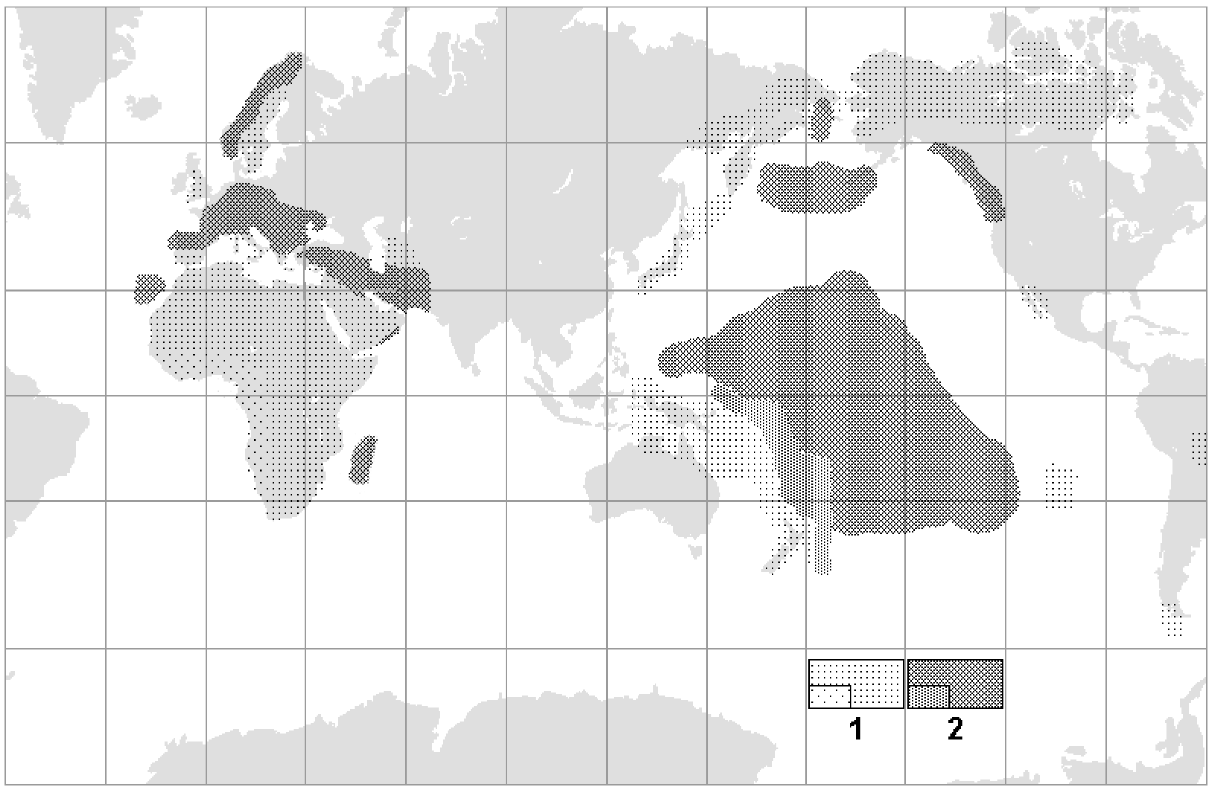

Figure 5. Cephalic dichotomy of the Earth *[Kochemasov 2007]*: **1** — long-headiness, **2** — short-headiness. Rarefied hatching mean a transition to mesocephaly.

There are also differences in the skin color (dark — light), the type of head hairs (woolly — curly or frizzy), and the skull shape in terms of the cephalic index (the ratio of the maximum width of the head to its maximum length *[Hrdlička, 1920]*). Africans are mainly dolichocephalic, while Polynesians are brachycephalic (**Figure 5**). However, there are two important symbolic tendencies marking shifts in skull shapes. First, the Pygmies, dwelling in the lowest parts of the continent, have somewhat shorter heads than most of surrounding tribes. Second, there is a clear tendency of mesocephalism in Africa westward to the Atlantic coast *[Olivier 1947]*, that is, along with the lowering of relief. Contrary to this, there is a trend of dolichocephalism in Pacific in the western direction *[Shapiro 1942]*, that is, along with the rising of relief. The Maori of New Zealand and Polynesians of the Easter Island are dolichocephalic peoples (both territories are upraised tectonic blocks).

The described global distribution of the cephalic index shows that uprising blocks initiate development of more gracile and dolichocephalic people, while subsiding blocks initiate formation of more massive and brachycephalic ones. There are exceptions to this rule, viz. orogenic belts or mountain chains. In this case, uplift alternates with subsidence making these blocks generally neutral. Brachycephalism increases with height at orogens of the Eastern uplifted hemisphere. Contrary to this, dolichocephalism increases with height at orogens of the Western subsided hemisphere *[Kochemasov 2006b]*.

There are examples of shortening head with approaching coasts, that is, transition from uplifted to subsided blocks: Africans towards the Atlantic coast (particularly western Cameroonians), Guanches comparative to continental tribes, Spaniards migrated to the Canary Islands, Galicians of Spain, French of Ré and Oléron Islands, Frisians of the Netherlands and Germany, Norwegians comparative to Swedes *[Kochemasov 2006b]*.

It is interesting to compare relationships between a tectonic situation and the skull shape of two African peoples characterized by short stature, viz. Pygmies and Bushmen. The former were formed in the Congo Basin on the subsided tectonic grain, while the latter — on the comparatively risen South African grain (both of grains are the Archean cratons). The Pygmies are relatively short-headed, while the Bushmen are long-headed. A long living in contrasting tectonic conditions led these two peoples to differences not only in the skull shape but in other physical characteristics as well. Indeed, the Pygmies are stockier, with relatively developed tertiary hair cover, big coarse face, and protruding eyebrow arcs, that is, there is a shift to Caucasian features *[Ranke 1894; Ratzel 1894]*. The Bushmen are subtler, with the weakest tertiary hair cover in the world, and, what is especially important, with some substitution of the dense flesh by the light fat (steatopygia, 'Egyptian apron' of women and 'fat belt' of men), that diminishes the overall density required by tectonics *[Kochemasov 2004b, 2006a]*.

At a larger scale, within a single tectonic grain — the East-European Craton — the relation 'tectonics–head shape' can be demonstrated by a pair of the uplifted Baltic Shield and the subsided Pre-Caspian Lowland. In this case, the long-headed Scandinavians oppose the short-headed Kalmyks (and Sarmatians in the early 1st millenium AD). Dolichocephaly is typical for peoples of risen cratons and shields around the world. Along with the Baltic Shield, this characteristic is peculiar to Inuits of Arctic North America and Greenland, Chukchi of the Chukotka Peninsula, and Evenks of the Eastern Siberia *[Topinard 1895; Harrison et al. 1964; Kochemasov 2006b]*. In the south, long headness is typical for the Aborigines of Australia, Fuegians of South America, and Zulus of Africa *[Topinard 1895; Harrison et al. 1964; Kochemasov 2006b]*.

Relationships between tectonics and the head shape can be illustrated by a comparison of a level of tectonic uplifting and a range of the cephalic index. There is the highest difference in tectonic uplifting between the Eastern and Western hemispheres. Populations of these hemispheres are also marked by the highest difference in typical cephalic indexes: Polynesians of the Western hemisphere has the cephalic index of 83—86, while Africans of the Eastern hemisphere — 73—78 *[Topinard 1895; Harrison et al. 1964]*. A tectonic uplifting difference is lesser for sectors. For instance, Sephardi Jews, formed on the uplifted sector, has the cephalic index of 75—79, while Ashkenazi Jews, formed on the subsided sector — 80—85 *[Fishberg 1902; Elkind 1902, 1912]*. Compared to sectors, blocks of tectonic granules are characterized by lesser tectonic amplitudes. As amplitude diminishes, a difference of inhabitant's cephalic indexes also diminishes. For example, on the East European Craton, cephalic indexes of Swedes, populated the uplifted block, and Kalmyks, living on the subsided block, are 76—79 and 81—83, correspondingly *[Topinard 1895]*.

Pygmyism

For several centuries, a global tendency of pygmyism has attracted attention of scientists, but it was not adequately explained. This is a problem of development of peoples with low weight and short stature in the equatorial (in a wide sense) region of the Earth. Disregarding on a race, peoples of this belt are essentially lighter and shorter in comparison with their neighbors living north- and southward *[Kochemasov 2008]*. This phenomenon exists in Africa (the Pygmies of the Congo Basin), America (tribes of the Amazon Basin and Central America), Asia (the Papuans, Veddoids, Negritos, Malays, and Vietnamese), and Oceania (Micronesians). This phenomenon was also observed in the animal world among mammals and was explained by the Bergmann's Rule stating that within a species the body mass increases with colder climate *[Blackburn et al. 1999]*. If this regularity is generally true for animals, it cannot be directly applied to human. First, human knows how to live in a cold climate. Second, in the hot tropical belt of Oceania, tall and massive Polynesians live practically together with shorter and lighter Micronesians. Thus, the temperature has nothing to do with human morphology (at least, this is not a main factor).

Some other reason should be found. The Earth's crust also has tendency to diminish its mass in the equatorial belt: its destruction and splitting into numerous islands is obvious. The reason is the spherical shape of the rotating Earth with a larger angular momentum of its equatorial belt and a tendency to diminish it. This includes destruction of the crust sinking its blocks, and so diminishing masses and radiuses, moving out denser components of the atmosphere (ozone, methane, and CO_2), making biological objects less massive and dense (e.g., dwarf forms of some mammals, like Spectacled Bear (*Tremarctos ornatus*) in Ecuador).

The longest latitudinal land profile of the Earth through two Americas gives us an opportunity to study this process in human's weight and stature. The northern Native Americans are tall and massive. The Rohrer index is rather high in both Americas (around 1.3—1.5) as they are parts of the Western subsided segment. However, it is higher in North America than in Central America (1.4—1.5 and 1.3—1.4, correspondingly). The Caribbeans, Central America, and Amazon Basin are populated with much shorter and lighter peoples. There are much taller Patagonians and medium Fuegians in South America. In Africa, there are larger Zulu in the south and Sudaneses in the north, as well as smaller inhabitants of the wide equatorial belt. In India, there are short Veddoids in the southern tip and taller Dravidians and other peoples living northward. In Southeast Asia, short Indo-Chinese (especially the Trungs living in a border area between China and Burma), Malays, and Papuans give place to relatively tall Chinese and tall Australian Aborigines. (It is symbolical and regular that short Barrineans dwell in the North Queensland forest of the extreme north of Australia). In the Pacific, very tall and massive Polynesians occur at both the northern and southern sides of the shorter and lighter Micronesians.

Changes of a Morphological Type on Tectonic Boundaries

Distribution of human biological races is generally consistent with natural boundaries between tectonic segments and sectors. However, there are single ethnic groups historically divided by these boundaries and displaying considerable transformations according to tectonic requirements.

In the beginning of the scientific anthropology, Broca (*1860*) has noticed that relatively tall population prevailed in the northeastern France, while relatively short one dominated in the southwest. A northwest-striking lineament, dividing these regions, is a portion of a boundary between the risen African–Mediterranean sector and the fallen Eurasian one (**Figure 2**). In the northwest, this line crosses the Great Britain with more massive, taller, and lighter Scots in the north and less massive, shorter, and darker Englishmen in the south. At a smaller scale, this tectonic boundary divides larger northern Europeans and smaller southern ones (for antiquity, this is a difference between shorter and darker Romans and taller and lighter Germans). Even in the Neolith, skulls from the north were more massive than skulls from the south: German Neanderthals were more massive than French ones *[Mednikova 2008]*. This is not surprising because the tectonic boundary is not moving in the historical time and always imposes its requirements on contacting tectonic blocks with their inhabitants.

A controversial question of origin of two types of European Jews, such as Sephardi and Ashkenazi, can be also solved on the tectonic basis. About two millennia ago, the Jews, having migrated from the Eastern Mediterranean, started to populate Western and then Eastern Europe. Those who settled in Spain and Italy (Sephardi Jews) kept the anthropological Mediterranean features of their ancestors (rather gracile, short or medium stature, dark pigmented, long-headed). Those who has crossed the tectonic boundary between the African-Mediterranean and Eurasian sectors and dispersed in the northern Europe, Poland, and Russia (Ashkenazi Jews) were transformed to more massive, tall, and lighter pigmented people with shorter heads, that is, they attained some northern Caucasian features. This example is especially valid because the Jewish people, evenly distributed over the two tectonic parts of Europe and thus splitted morphologically, was carefully studied by renown anthropologists *[Ivanovsky 1900; Elkind 1902, 1912; Fishberg 1902, 1903, 1905]*.

The Ural Mountains play a role of the boundary between the East European and West Siberian sub-sectors of the Eurasian sector (**Figure 2**). This boundary divides two lithospheric blocks with different geologic histories as well as two allied ethnic groups, Finnish and Ugric peoples, with distinctive anthropological characteristics. The former occupies the north of Eastern Europe, while the latter populates the north of Western Siberia. Some scientists suppose that Finns were dispersed wider, over much of Europe in the remote past *[Broca 1864]*. Historically, Ugric peoples crossed the Urals many times and penetrated into Europe influencing ethnogenesis in the area between the Urals and Volga River mingling with the Turks and Finns *[Kazakov 2007]*. Some tribes went further and reached the Danube River (the present Hungary). Morphologically, Finns are taller, lighter pigmented, and shorter-headed. Ugric peoples are shorter, darker, and longer-headed. Their origin is rather uncertain (probably, the Altai Mountains) but they are Caucasians bearing essential Asian features.

Other examples concern the Asian sector and its subsectors. The tectonic bisector divides the sector into the higher High Asian subsector and the lower East Siberian one (**Figure 2**). Anthropologists clearly distinguish the northern and southern Chinese *[Legendre 1913]*. The former are taller and lighter in coloration resembling Caucasians (or Assiroids *[Legendre 1913]*). The latter are shorter, darker in pigmentation, more long-headed, resembling Africans from the highly risen tectonic sector. This is not surprising because a level of tectonic uprising of the High Asian subsector is close to that of the highly uplifted African sector.

A bisector divides the Japanese Islands into two parts with anthropologically different populations. In the north of Honshu Island and on Hokkaido Island, a relatively intensive growth of the beard is coupled with tall in Japanese standards stature, high face, low nasal index (the ratio of the width to the height of the nose, multiplied by 100), and the lightest pigmentation. In the south on Shikoku Island, natives are marked by short stature, longer-headed, higher nasal index, and scarce beard *[Levin 1961]*. Thus, the tendencies of morphological changes on both sides of the bisector are the same for the Chinese and Japanese. The relative uplifting of the subsectors causes these tendencies.

The higher tectonic elevation difference between neighboring blocks, the stronger anthropological difference between allied populations separated by a block boundary. Polynesians and Melanesians present the best comparative material since they have been formed on two principally different tectonic blocks: the Pacific Basin and its continental rim. The Polynesians are tall, massive, curly, and frizzy haired, with moderate beard, brachycephalic, possessing some tendency of the lighter pigmentation. The Melanesians are much shorter (down to 10 cm), woolly haired, dolichocephalic, with dark pigmentation *[Howells 1933]*. Of special interest is an area of contacts between Polynesians and Melanesians at numerous islands of the Western Pacific. Melanesians (by language and culture) populate the Fiji Islands, the most protruding into Pacific continental land. However, they bear many Polynesian physical features. They are brachycephalic and much taller and lighter than typical Melanesians *[Howells 1933]*. A usual explanation of this phenomenon includes migrations and mixing. However, Maori, settling at the continental New Zealand, became shorter and long-headed without any mingling with Melanesians. They were transformed according to the tectonic environment. In a similar manner, Melanesians lose their dolichocephaly and acquired brachycephaly living on some littoral islands.

Changes in Tectonic Situation and Human Morphology

Uplifted and subsided tectonic blocks are not stable in their positions: they gradually move up and down. Some blocks had slightly different hypsometric positions even at the recent past, when *Homo sapiens* appeared. For example, Africa is steadily uplifting during the last few million years. This is testified by changes in its shoreline, uplifted young sea sediments, and steadily expansion and rifting *[Jackson & Hudec 2005]*. The Eurasian sector is characterized by remarkable folding of its young sedimentary cover caused by steady subsidence. It seems reasonable to suppose that changes in a hypsometric position or a tectonic regime may lead to appropriate morphological changes of peoples.

Many examples, sometimes mysterious, prove this proposal. Indeed, Bushmen, the oldest African population, are sometimes called the African Mongoloids *[Ranke 1894; Ratzel 1894]* because of their epicanthus, light yellow skin, and some other characteristics. In Europe, minor Asian features of populations in some eastern and western regions caused much controversial discussions *[Alexeev 1961]*. Considering a tectonic background, it simply means that Africa in the past was slightly lower (compared to the Asian moderately uplifted sector), and the Eurasian sector was not yet so subsided and much closer by altitude to the Asian sector. This also means that the human morphology is not yet fully stable and continually changes in tendency to reach some rectified purer characteristics.

To illustrate a process of relatively slow change of human morphological characteristics after changes of a tectonic situation, one can look at the cheekbone diameter of Caucasian and Asian paleo-skulls (**Table 1**). It is known that this cranial attribute of the former is smaller than that of the latter *[Débetz 1961]*. From the Neolith to the Middle Ages (a period of 3,000–4,000 years), the cheekbone diameter of crania from the Eurasian sector was clearly decreased, that is, primary strong mongoloidness of Caucasians gradually become less manifested (so-called 'gracilization' *[Débetz 1961]*). In contrary, the cheekbone diameter of Mongoloid crania from the Asian sector, already being larger in the Neolith, was gradually increased to the Middle Ages, that is, mongoloidness grew stronger (**Table 1**). The slowly subsiding Eurasian and slowly uplifting Asian sectors caused this tendency.

Table 1

Cheekbone diameters of paleo-skulls in Eurasian and Asian sectors of the former USSR *[Débetz 1961]*

Eurasian sector			Asian sector		
Historical period	**Number of skulls**	**Cheekbone diameter, mm**	**Historical period**	**Number of skulls**	**Cheekbone diameter, mm**
Neolith and Eneolith (2500—1500 BC)	200	139.8	Neolith, Eneolith, and Bronze Age (2500—1000 BC)	141	142.2
Bronze Age (1500—800 BC)	187	137.1			
Scythian Period (800—300 BC)	390	136.0	Early Iron Age (800 BC—200 AD)	19	142.9
Sarmatian Period (200 BC—500 AD)	618	133.7			
Middle Ages (500—1500 AD)	1,352	133.8	Middle Ages (1200—1600 AD)	94	143.0

Slow changes of human morphological characteristics can be also caused by human migrations from one planetary tectonic block to other. Gould (*1869*) has made comparisons of body massiveness of North American inhabitants, and has been surprised that Native Americans have had the highest weight-to-height index. For western Europeans, this index ranged from 364 to 382 (Spaniards and Scandinavians. correspondingly), for white North Americans — from 374 to 375 g/cm, for blacks and mulattoes — 387 g/cm, but for the Iroquois it was as great as 422 g/cm. Larger weight of Native Americans was wrongly interpreted as an evidence of their indolence. Gould (*1869*) also noticed that black immigrants (slaves) acquired larger body in America in comparison with their compatriots in Africa. The author supposes that the well-known tendency of North Americans of all colors and ethnic origin to acquire an extra weight is simply an adaptation to tectonic conditions of the segment with reduced planetary radius. It seems that an adaptation of the human organism to changes of gravity conditions (more exactly, to changes of the angular momentum of tectonic blocks), occurring under migration along the Earth's surface, does not require millions of years.

Chemistry of Hairs

Some anthropologists suppose that about 90 % of distinctions between the human races are in hairs *[Cheboksarov 1936]*. It is known that hair is a compositionally different and denser prolongation of the skin *[De Quatrefages 1896]*. This addition of a denser matter helps to increase an overall density of the human organism occurring in conditions when a diminished planetary radius requires an increased density of a substance. In the lithosphere, this requirement is fulfilled by an addition of denser rocks (iron enriched rocks, such as tholeiites and gabbro). Human being responds to this requirement not only by adding or by removing the tertiary hair cover but also by changing hair color and composition.

Natives of Africa and Asia (uplifted sectors) are not so hairy and always black haired. Inhabitants of Europe and children of Australian Aborigines (subsided sectors) are often brown haired, blond, and usually well hairy and shaggy *[Harrison et al. 1964]*. Some Polynesians are light haired *[De Quatrefages 1864]*. The pigmentation is determined by quantity, quality, and distribution in hairs of melanin that can be black, brown, red, and yellow. Black eumelanin is the main pigment of black hairs. Pheomelanin of reddish and brownish colors is added to the lighter hairs. The first substance is mainly composed of C, H, N, and O, while the second one includes S, heavier element. Besides, an overall human hair density is also changing: in the subsided Eurasian sector, hairs are more ferruginous, that is, denser than in the uplifted Asian sector *[Kochemasov 2004a]*. The metal content in the head hairs of the population of the lower Eurasian sector (Russians, Tajiks, and Chukchi) differs from that of the neighboring higher Asian sector (9 ethnic Asian groups).

An instrumental neutron activation analysis of 2,117 hair samples for 11 microelements (**Table 2**) demonstrated that only Fe and Mn have quite contrasting and regular variations *[Batzevich and Yasina 1989]*. Fe content varies from 37 to 139 mg/kg in male hairs and from 17 to 100 mg/kg in female hairs. Mn content varies from 0.87 to 5.56 for men and from 1.03 to 8.76 for women. Fe/Mn varies from 8.3 to 84.5 for men and from 1.9 to 52.1 for women. In the subsided sector, male and female hairs contain more Fe and less Mn than in the uplifted sector, that is, they are more ferruginous and so denser. Differences between sectors for Fe and Mn contents are more contrast for women (**Table 2**).

Table 2

Content of microelements in hairs of people from Eurasian and Asian sectors (median values, ppm)

	Male		Female	
	Eurasian sector	**Asian sector**	**Eurasian sector**	**Asian sector**
Fe	92.6	71.8	63.8	36.6
Mn	1.66	3.14	2.07	4.26
Fe/Mn	61.8	24.6	34.2	11.0
Cr	0.510	0.433	0.339	0.336
Co	0.069	0.082	0.072	0.081
Zn	184.9	172.9	185.4	195.9
Cu	15.8	14.9	14.8	15.1
Sc	0.025	0.022	0.019	0.013
Sb	0.398	0.308	0.233	0.173
Se	0.544	0.664	0.510	0.675
Hg	0.672	0.174	0.652	0.217
Au	0.0137	0.0119	0.0127	0.0157

Zn and Cu contents are slightly higher in the subsided sector for men and in the uplifted sector for women. Sc and Sb contents are higher in male hairs in the subsided sector than in the uplifted one. Se content is slightly higher in the uplifted sector, while Hg content — in the subsided one (**Table 2**).

Acceleration of Human Growth

There is a clear tendency of the Earth to slow down its rotation *[Sidorenkov 2002]*. The lithosphere reacts to this process by a systematic insert of dense basaltic material into the crust mending decreased momentum. We suppose that the anthroposphere also reacts as human gradually becomes larger and taller. If the decelerating Earth actually requires increased individuals, the process cannot be straight. Indeed, the speed of the Earth's rotation undulates: periods of deceleration alternate with periods of acceleration. Hence, human is forced to accelerate its growth or to retard. Let us compare data on the Earth rotation speed and anthropometric statistics.

More or less systematic measurements of the Earth rotation speed are known from the 17th century when the speed was rather high *[Sidorenkov 2002]*. From 1700 to 1860, the speed fluctuations were not very tangible but the speed was lower than in the previous period. Then, the speed accelerated and achieved a peak nearly 1870. Then, it again decelerated with a minimum in 1903. Speed fluctuations in the 20th century are presented in **Table 3**.

Table 3

Speed fluctuation of the Earth's rotation *[Sidorenkov 2002]*

Period	Mode of speed fluctuation
1903—1934	acceleration
1935—1947	deceleration
1948—1953	acceleration
1954—1955	deceleration
1956—1961	acceleration
1962—1972	deceleration
1973—1988	acceleration
1989—1994	deceleration
1995—present	acceleration

In the mid-19th century, some stature shortening was observed in several European countries. In Russia, for example, an average stature of conscripts has lowered by 3 mm from 1873 to 1884, and has continued to decrease in the 1890s *[Bunak 1932]*.

In the late 19th and early 20th centuries, human stature in Europe increased gaining from 6 to 10 mm for a decade. In Russia, this process has started later and was weaker *[Bunak 1932]*. In 1910—1925, in the north-western Europe the growth has continued but with a slower rate: in Sweden an average stature of conscripts varied from 1,719 to 1,727 mm, in Norway — from 1,718 to 1,771 mm, and in Denmark — from 1,689 to 1,695 mm. In Europe, acceleration of human growth started in the 1960s with a peak in the mid-1970s. Elements of retardation were observed starting from the 1980s and developing in the 1990s.

This short analysis suggests some influence of the Earth's rotation rate on acceleration and retardation processes in the human growth. Previous consideration of this important phenomenon did not come to definite conclusions *[Solovyova 1967]*.

Dendrosphere

There is a concordant structurization of various geospheres, such as lithosphere, atmosphere, and anthroposphere, due to an energetic impetus produced outside of them (see Section 'Pygmyism'). The impetus is evoked by a tendency of the rotating Earth to diminish an increased angular momentum of its equatorial belt (see the 5th theorem of the wave planetary tectonics — Section 'Tectonic background'). Let us discuss the dendrosphere, a realm of trees, in this context. Like the anthroposphere, the dendrosphere is very convenient object for this comparative study as the trees cover the majority of the landmass including different tectonic blocks.

Averaged densities of timber for tectonic blocks and belts repeat the structural pattern established by the crustal blocks and the human morphological types (**Table 4**). Generally, density of economic timber on the Earth varies from 128 to 1300 kg/m^3, which is much higher than that of the major rock types (from 2 to 4 g/cm^3) and the Rohrer index of human (from ~1 to 2).

The tectonic dichotomy of the Earth is manifested in the dendrosphere. Indeed, within the tropics, average timber densities of the foliage trees for the Eastern uplifted and Western subsided segments are 710 and 745 kg/m^3, correspondingly. For the Northern hemisphere outside the tropics, average timber densities within the Eastern and Western segments are is 578 and 616 kg/m^3, correspondingly. Thus, the timber density is generally higher in the subsided oceanic segment (**Table 4**).

Table 4

Average timber density (kg/m^3) in different regions

Numbers of species are in brackets

<table>
<tr><th colspan="2"></th><th colspan="2">Western segment</th><th colspan="2">Eastern segment</th></tr>
<tr><td rowspan="3">Northern hemi-sphere</td><td rowspan="2"></td><td>North America</td><td>616 (40)</td><td>Europe and Northern Asia</td><td>578 (137)</td></tr>
<tr><td>Philippines</td><td>738 (39)</td><td>India and South Asia</td><td>751 (67)</td></tr>
<tr><td rowspan="3">Equatorial belt</td><td>Central America</td><td>725 (54)</td><td>South-Eastern Asia</td><td>702 (57)</td></tr>
<tr><td rowspan="3">Southern hemi-sphere</td><td>South America</td><td>762 (88)</td><td>Africa</td><td>697 (107)</td></tr>
<tr><td>Fiji</td><td>720 (2)</td><td>New Guinea</td><td>605 (30)</td></tr>
<tr><td></td><td>New Zealand</td><td>710 (5)</td><td>Australia</td><td>785 (36)</td></tr>
</table>

The timber densities also reflect the dichotomy of the Northern mainly continental and Southern mainly oceanic hemispheres (**Table 4**). The average timber density for the Northern and Southern hemispheres (without Africa belonging to both hemispheres) are 729 and 766 kg/m^3, correspondingly.

Having a larger angular momentum, the equatorial belt shows a tendency for destruction not only in the lithosphere (fragmentation of the crust), atmosphere (expulsion of the heavier components), and anthroposphere (pygmyism) *[Kochemasov 2008]*, but also in the dendrosphere (decreasing timber densities). In the equatorial belt (Table 4), an average timber density is 693 kg/m^3. Outside the equatorial belt but within the tropics, an average timber density is 757 kg/m^3.

The global tendencies for the timber density are supported by data for individual tectonic sectors. In the Atlantic sectoral structure, the highly uplifted African sector of the Eastern uplifted segment has an average timber density of 697 kg/m^3. The opposed uplifted South American sector of the Western subsided segment has an average timber density of 762 kg/m^3. In the Pamir — Hindu Kush sectoral structure (**Figure 2**), the highly uplifted African sector has an average timber density 697 kg/m^3, while the highly subsided Indoceanic sector has an average timber density of 751 kg/m^3 in India and 785 kg/m^3 in Australia (**Table 4**).

In some cases, a comparison of individual species is rather demonstrative. Indeed, the timber density of the ebony tree in Africa (*Diospyros piscatorial* Gurke) is 1030 kg/m^3, while in India (*Diospyros ebenum* Koenig) — 1190 kg/m^3. Teak tree (*Tectona grandis* L.f.), transplanted from the Eastern uplifted segment on Trinidad Island of the Western subsided segment, increased its density from 660 to 688 kg/m^3. This is a rare but important case of increasing density under implantation of a species to other region. Introduced species usually decrease density on a new place due to some peculiarities of growth *[Brown 1980]*.

Conclusion

The physical anthropology deals with various geographical environments and finds connections between them and physical characteristics of populations. In many cases, this approach is sufficient to explain some peculiar features of *Homo sapiens* by

adaptation processes. However, ways and mechanisms of development of the major groups of the human species, racial classifications, a number of human races, and especially the existence of human races are still debated. Considering the principles of the wave planetary tectonics, it is possible to demonstrate relationships between human morphological diversity and global tectonic features. The number of human races corresponds to number of the main tectonic blocks differing in planetary radii. Various radii require various densities (massiveness) of individuals populating these blocks that contribute to tendency of leveling angular momentum of these blocks in the rotating planet. There are two the first-order segments: the Eastern risen continental hemisphere populated by the 'older' *Homo sapiens*, and the Western fallen oceanic hemisphere populated with the 'younger' ones. The segments are comprised of tectonic sectors responsible for the development of six human races: African, Caucasian, Asian, Australian, Native American, and Polynesian. Global distributions of dolichocephalic and brachycephalic human types as well as phenomena of pygmyism and acceleration of human growth are also controlled by tectonic processes. Morphological changes of a particular population occupied some region may be caused by (a) slow changes of tectonic regime, and (b) people migration to other region marked by a different tectonic situation. The deep planetary structure should be considered as one of the main causes of the human morphological differentiation. The tectonic influence on the global distribution of timber density testifies the universal character of the tectonic control of the biosphere.

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ГЛОБАЛЬНАЯ ТЕКТОНИКА И РАЗНООБРАЗИЕ МОРФОЛОГИИ ЧЕЛОВЕКА

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Автор представляет новую глобальную тектонику, основанную на двух неоспоримых фактах планетологии: все небесные тела движутся вокруг центрального тела (Солнца и планет) и вращаются. Движения по эллиптическим кеплеровским орбитам с периодически меняющимися ускорениями неизбежно вызывают волновые коробления небесных тел. Во вращающихся телах эти коробления имеют четыре орто- и диагональные направления, которые интерферируют и производят поднимающиеся и опускающиеся тектонические блоки. Размер блоков зависит от длины коробящей волны и равен двум полушариям (сегментам) и наложенным на них секторам и тектоническим зернам. На Земле осложняющие полушария секторы складываются в октаэдрическую фигуру, шесть вершин которой являются хорошо известными тектоническими и морфологическими антиподальными объектами: Памир — Гиндукуш — остров Пасхи, Центральная Атлантика — остров Гвинея, Берингов пролив — остров Буве. Четыре разноуровенных сектора Восточного полушария, сходящихся к Памир-Гиндукушской вершине, образуют две противостоящие пары: поднятые Африка и Азия (+) и опущенные Евразия и Индийский океан (-). Это текотническое строение литосферы и коры, отражающее с инверсией колебания границы ядро-мантия, хорошо отражено на знакомых нам физико-географических картах Земли. Угловые моменты разноуровенных блоков вращающейся Земли должны стремиться к равновесию, иначе тело планеты будет разрушаться. Вот почему опущенные блоки заполняются плотными породами (базальты океанов), а поднятые — менее плотными (граниты континентов). Но требование уравновешивания угловых моментов касается не только пород, но и составляющих других геосфер, в частности, биосферы. Антропосфера и дендросфера оказываются дифференцированными согласно принципу сохранения угловых моментов разноуровенных тектонических блоков. Так появились четыре больших морфологических типа (рас) человека: белые, черные, желтые и бурые[1]. Позднее в результате миграции

[1] Бурыми в старой (рубежа XIX—XX вв.) антропологической литературе назывались аборигены Австралии и соседних островов

желтых (азиатов) появились бурые (аборигены Америки) и полинезийцы — продукт адаптации к наиболее глубокой впадине на теле Земли — Тихому океану. В работе рассмотрены и другие аспекты эволюции человека — образование пигмеоидных форм, процессы акселерации и ретардации в ходе изменения скорости вращения Земли, адаптации волосяного покрова и формы черепа.

Ключевые слова: волновая планетология, тектоника Земли, антропология, тектоноантропология, морфология человека, большие расы человека, дендросфера.