

THE HEAVY MINERALS SHORE PLACERS OF ADRIATIC SEA IN ALBANIA

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ABSTRACT

The heavy mineral placers are located along the shore of Adriatic Sea of Albanian territory. The aim of this article is to give the information about the condition of their extension, genetic types of placers, their mineralogical composition and their practical importance.

KEY WORDS: Albania, Adriatic seashore, sand deposits of the seashore, heavy mineral placers.

1. INTRODUCTION

Shore placers of Adriatic in Albania are found and discovered since 1960 from the department of Mineral sources of the Faculty of Geology and Mining of Tirana, under the leadership of Prof. Zihni SINOINERI. In 1964 a pilot project plant (enterprise) was built in Durres which enriched about 10.000 tons of heavy minerals concentrates for year. This plant has worked continuously till 1994 with a great economical profit, producing concentrations of zircon, rutil, ilmenite, titanomagnetite, chromite, magnetite, garnet, barit etc. This plant considerate profitable the compositions of 30 kg/ton of heavy fractions to word ilmenite. But it also exploited the very enriched parts.

The theoretical basis of this study are: a) the sources of minerals from rocks of Albanides and b) the transportation of shredded materials from the hydrologic mountain network to the shore of Adriatic sea and the formation of heavy minerals shore placers location.

2. EXTENSION OF THE SHORE PLACERS

Heavy minerals shore placers are located between the sands of Quaternary of the Adriatic seashore. They have a 200-km length, from Buna river in the North, near to the bay of Vlora in the South. These depositions make up the zone of fields and seashore with a width from some meters till 16-Km (Fig.1)

Adriatic seashore in Albania (in contrast from Ionian seashore) is of accumulative type continent toward west, although in district sectors and capes there are some local abrasive characteristics.

Shelf zone has a small inclination; and the deepens of water 50 m reach the length of 20-25 Km from seashore. In the vicinity of the seaside the bottomland of the sea is characterised by lifting of sand which are in continuous movement (Ostrosi, 1977; Sinoimeri, 1966, 1970). There are a great number of mountain rivers that pour in Adriatic Sea with a density of 1.8 Km/Km² and these rinse all the structures of Albanides. They pour into the sea approximately 41.2 km³ water and 53*10⁶ ton alluvions for year. These have seasonal characteristics (Qiriaz, 1986).

The numerous shredded materials that comes from continent forms great delta at the mouth of these rivers. The Adriatic Sea has south sea flows which collide with an angle with seashore when the direction of these sea flows, during storms correspond with the direction of waves action and the action of high and low tides all delta's material begin to move toward North-East and begin to depose in the beaches. During these movement the shredded material differentiates to the greatness and gravity creating the concentration of heavy materials.

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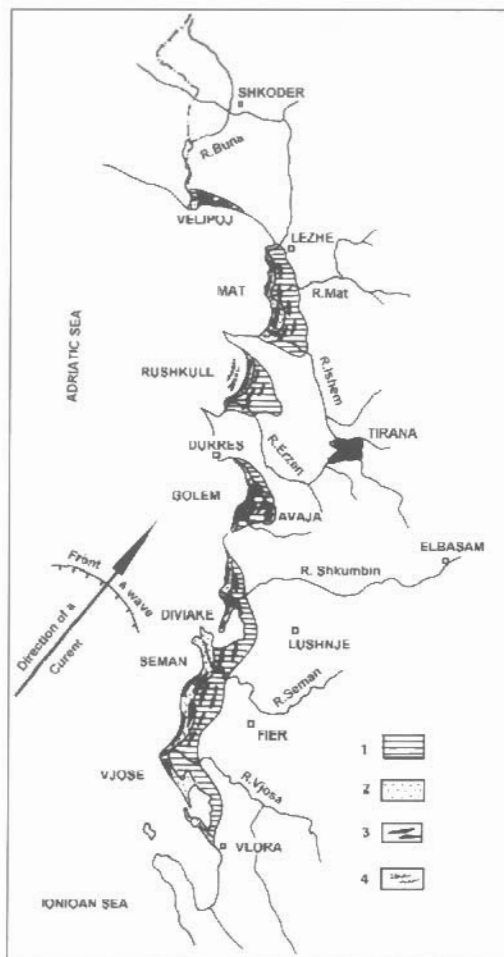


Fig.1: Geologic scheme of the shore placers of Adriatic Sea in Albania. 1. Marine and bog deposits- Q_4d (sand and argillas). 2. Sand of the seaside. 3. Heavy minerals body. 4. Marine placer body.

The differentiation takes place under water and intensifies in beaches that are wetted from the waves and are periodically released from waves' water.

3. TYPES OF PLACERS

All the concentrations of heavy minerals are placed in parallel strips with the actual seaside. The studies show that we have 3 types of placers; shore placers, dune placers and underwater marine placers. (Fig.2, Sinoimeri, 1966,1970).

- **Shore placers:** are located in the wet line of beach that are in contact with waves and are in continuous formation. These placers are developed in the northern part of the mouths of the rivers Mat, Ishmi, Erzen, Shkumbin, Seman, Vjosa etc. Their length is 3-5 Km, their width is 3-15 m and their thickness is 0.2 – 0.6m.

The texture of this placer is made up from black strips and lines of heavy metals, mixed with each other with a thickness 2-3 mm till 5-6-10 mm. All these strips form lenses 5-12⁰ toward the sea. (Fig.3).

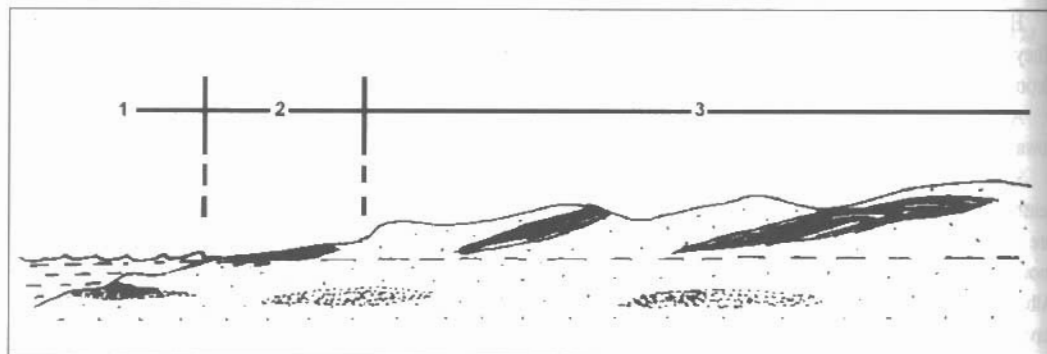


Fig. 2: Schematic profile of the types of placers on the Adriatic Sea. 1) Submarine placers. 2) Shore placers. 3) Dune placers.

- **Dune placers:** are old beach placers left by the removal of the sea. They have the same composition as shore placers. They have an extension of 4-15 Km behind shore placers in all seaside area.

They are discovered in the vicinity of beaches or inside the continent and are covered by wind sands or clay deposits of swamps thick 0.20-1 m.

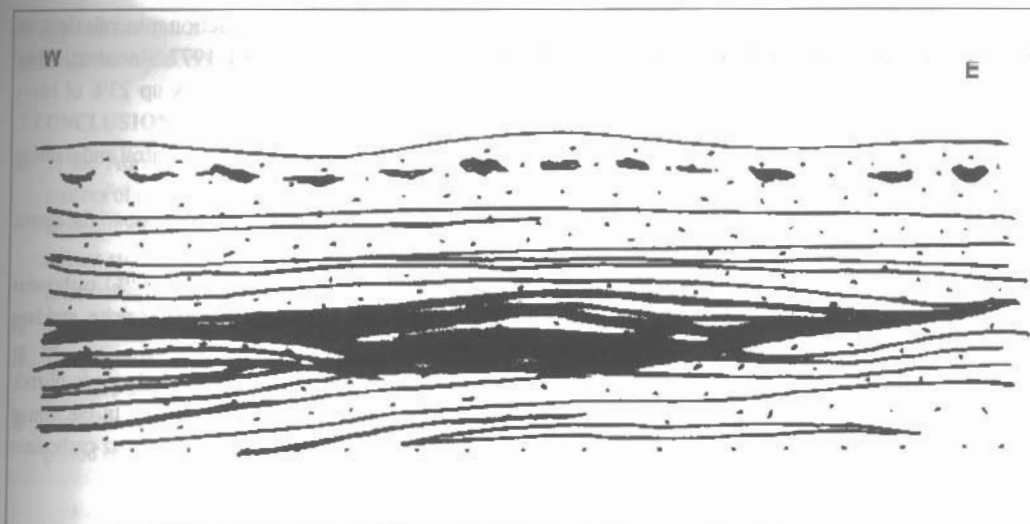


Fig. 3: Lines texture of heavy minerals in the shore placers of Rushkulli deposit.

• **Marine placers:** are not fully studied but they really exist. They are studied in the beach of Rushkulli and their presence is also studied in other beaches. They are in 2 different types: a) nowadays placers, which are still formed, and b) old ones buried.

The nowadays placers are found every where, under water and in pont of shore placers. They begin approximately 50 – 100 m from the seaside line and continue with a width 3-5 Km and thickness 3-10 m. They are located at the smooth side of sand lifting of the and of sea. Distinct body placers have a width 50 – 100 m and an extension 2-3 Km. Different experiment are mode and samples are taken in 0.25 cm deepness. The composition is 25-30 kg/ton heavy minerals, and their granular sand composition is smaller than that of beaches. The mineralisation texture is generally uniform, without strips and lines.

Buried marine placers are found under dune placers in 1-1.5 m deepness from the surface.

4. MINERAL COMPOSITION

The identified minerals are divided into 2 groups: a) heavy raction minerals and b) light fraction minerals. The heavy fraction makes up 8 – 16% of all the sand mass. Useful minerals like making up 52% of this fraction: titanomagnetite, chromite, ilmenite, garnet, leucoxene, zirkon, rutile, barite and sphene (Table 1).

Table 1: Minerals composite of Adriatic placers

No Placers deposits	Contents							
	Titano -magnetite	Chromite	Ilmenite	Zirkon	Rutil	Garnet	Leucoxene	Barite
1 Northern shore, Mati stream	43.6	10.50	4.2	0.065	0.067	0.90	0.25	0.01
2 Central-Northern shore, Erzen stream	0.5	12.50	7.7	0.600	0.620	10.70	0.60	0.13
3 Central-Southern shore, Shkumbin-Kavaje stream	2.6	16.55	5.0	0.150	0.320	6.90	0.30	0.11
4 Southern shore Seman-Vjosa stream	2.8	26.60	5.2	0.410	0.770	10.65	0.82	0.91

There are also small amounts of monacite, ortite. In association with heavy fraction minerals there are also pyroxen, amphibol, epidote, kyanite, tourmaline limonite and pyrite (Ostrovi, 1977; Sinoimeri, 1966).

In the northern seashore the mineral of titan has a great extension and makes up 23% of heavy fraction, in contrast with the south when they make up 18% of heavy fraction.

In the northern shores the mineral of titan is found as titanomagnetites, but in the central and southern beaches it is found as ilmenites, rutil, leucocoxen.

In the northern beaches the main minerals are chrom and titanomagnetites, in contrast to the central and southern beaches, which are chromite, zircon, rutil, ilmenites, garnetes etc.

The light fraction makes up 84-92% of sand mass. Its main minerals are: quartz (32%) carbonates (20.6%), feldspathic (13.3%), serpentinite – chlorite (5%) and the rest is made of mika, calcite, and faun residue.

In northern beaches quartz and feldspathic are in small amounts but the main part is made of rock peaches and minerals of serpentino-chlorite which gives the sand a grey to green colour. In the central seashore the principal compound is quartz (50-70%) while in the southern seashore are quartz-carbonates compounds.

5. GRANULAR COMPOSITION OF PLACERS

Sand placers made up facie marine, seaside with a good and medium assortment. The sands of northern seashores are thick granules with a medial diameter 0.37-mm. The sands of central and southern beaches have a diameter 0.22 mm. (Fig.4).

The heavy fraction minerals have a smaller diameter from south to north: 0.17 mm (south), 0.19 mm (central) and 0.22 mm (north).

The average diameter of the greatest part of heavy minerals is between 0.4 – 0.1 mm (Sinoimeri, 1966).

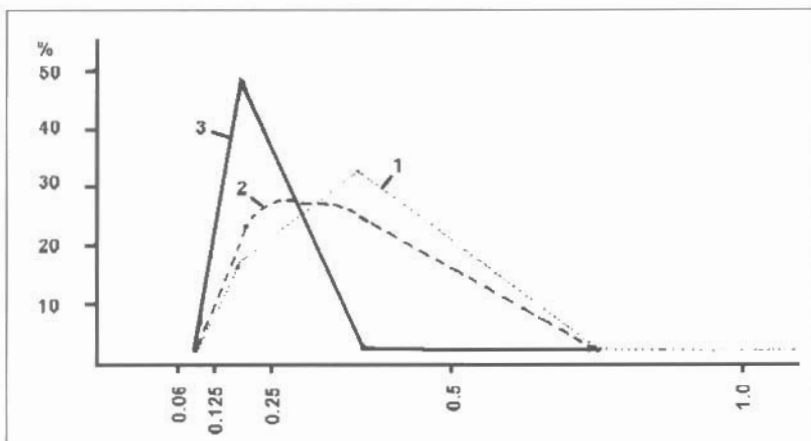


Fig. 4: Variation of the sand granular of the Adriatic Sea. 1) North seaside. 2) Central seaside. 3) South seaside.

6. MINERAL SOURCES FOR PLACERS FORMATION

Shore placers are formed from the rinse and transportation of shredded rocks of Albanides by the hydrographic network of rivers. The sources are of 2 types:

a) The first sources are the ophiolitic magmatic rocks and their presence is confirmed by the high content of titanomagnetite and chromite in the northern beaches, where rivers of these parts rinse this type of rocks (Sinoimeri, 1970).

b) Secondary are the sources of accessory shredded rocky minerals from Paleozoic until Tertiary. These rocks contain also minerals come from central massive rocks of Balcan in past geological periods. This is evidenced by the presence of Permian-Triassic in Korabi area.

or old placers in sands Tortonian in the basins of Adriatic's lowlands, which have the same composition as the actual shore placers.

7. CONCLUSIONS

- In the Adriatic seaside of Albania all the conditions for placer formation exist. These are a) the sources of continuous placer formation like: magmatic and shredded sedimentary rocks that contain a large number of heavy minerals. b) The broken relief with many small mountain rivers that transport a great stuff of shredded materials to the sea. c) Adriatic seaside is accumulative type with very good conditions for the differentiation of shredded materials and heavy minerals.
- The actual placers are of 3 types: shore placers, dune placers, marine-under water placers.
- The principal useful minerals are: zirkon, rutil, ilmenite, chromite, titanomagnetite, garnet, barite etc, but there are also small amounts of monacites, ortites etc.
- Shore beaches and under-marine placers have the quality to be reformed after their exploitation in the period of ten years.

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