



Hydro-engineering and environmental problems in Poti Black Sea region and ways of their solution

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Work is dedicated to the development of hydro-engineering and environmental protection measures in the Black Sea regions, the main Georgian port of Poti at the mouth of the Rioni, which will minimize the region geomorphological changes caused by the influence of natural and anthropogenic factors, and will over a long period protect coastal areas of these regions from washouts and large scale silting processes.

The research objects are:

1. Poti seashore, which has retreated for hundreds of meters, promoted with the existence of underwater canyon along the southern pier of the port;
2. The Rioni river watershed dam, the tail race of which in time was subjected to destruction and substantial washout. Currently the stability of the dam is endangered;
3. "City Canal" - the Rioni river old bed, which is greatly silted up and is virtually unable to perform its function – to feed Poti seashore with solid matter.

The work for the hydrodynamics solutions using high-precision mathematical methods. In particular, for the establishment of coastal longshore migrations of sediment and deformations of the coastal zone is used finite element method, Crank-Nicolson scheme and method of upper relaxation in the calculation of wave propagation in the estuarine areas of the Rioni River uses direct and asymptotic (particularly WKB) Methods of mathematical analysis. The results obtained using these models will be put as a base of development of such engineering measures and design proposals which:

- a) will provide sustained increase of Poti coastal line on the basis of working out of exploitation regimes of the Rioni watershed hydro complex and as a result of performing additional engineering measures in "City Canal";
- b) will thoroughly protect the Rioni watershed hydro complex dam tail-water from destruction and washouts.

The packets of mathematical programs and analytical methods of calculation worked out in the work may be used for the solution of the similar tasks for any closed sea coastal areas at design of hydro-technical constructions.