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Application of Deep GPR method in engineering-geological research of earth dams



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Deep GPR research of an earthen dam. Kazakhstan



Identification and mapping of structural elements of the structure of landslide slopes, determination and localization of the development of secondary landslide processes is an important aspect in predicting and preventing the development of hazardous geological processes.

Due to the use of modern **Deep GPR** methods, the efficiency of design and arrangement of drainage systems, anti-landslide curtains, a set of measures to strengthen the slope is increased

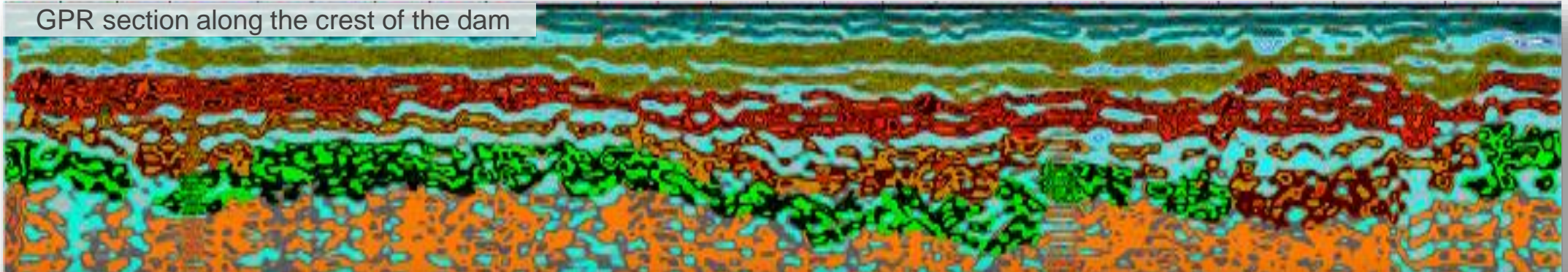
DGPR profiling of the rear slopes of the dam



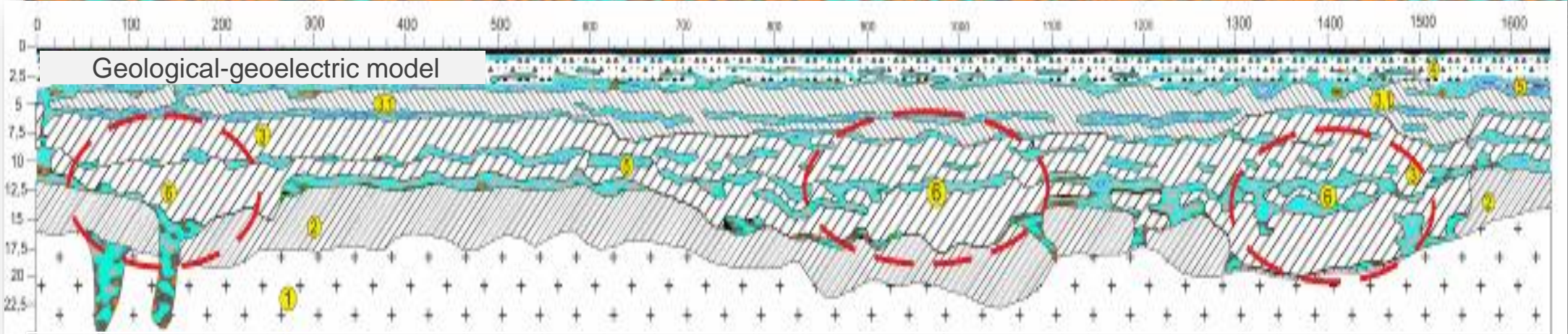
Deep GPR research of an earthen dam. Kazakhstan

Deep **GPR** profiling along the crest of the existing dam made it possible to identify areas of deformation of layers, localize areas of development of subsidence and suffusion processes, as well as zones of horizontal filtration

GPR section along the crest of the dam

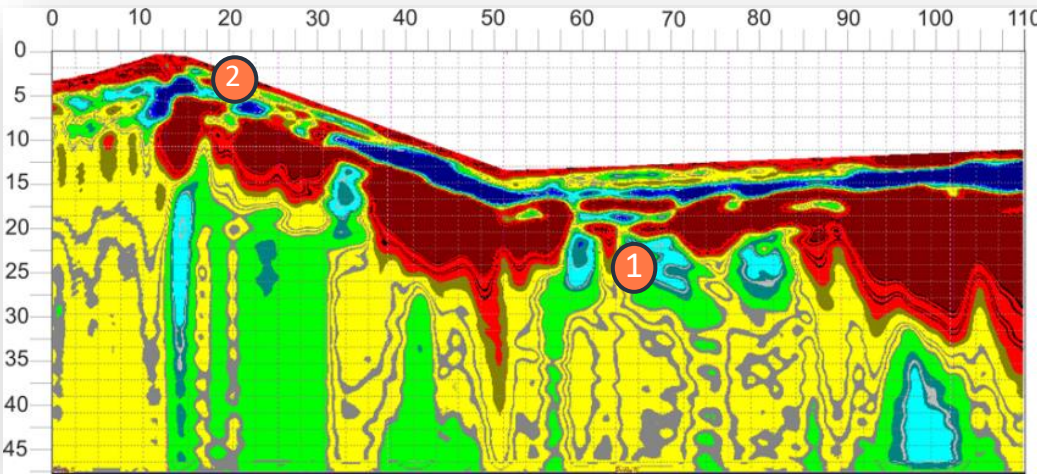


Geological-geoelectric model



- | | | | |
|------------------------|-------------------|---|----------------------------|
| 1 – bedrock; | 3 – loams; | 4 – sand with gravel; | 5 – water saturation zone; |
| 2 – sand-gravel layer; | 3.1 – sandy loam; | 4.1 – subsidence and suffusion anomaly; | 6 – soil deformation zone; |

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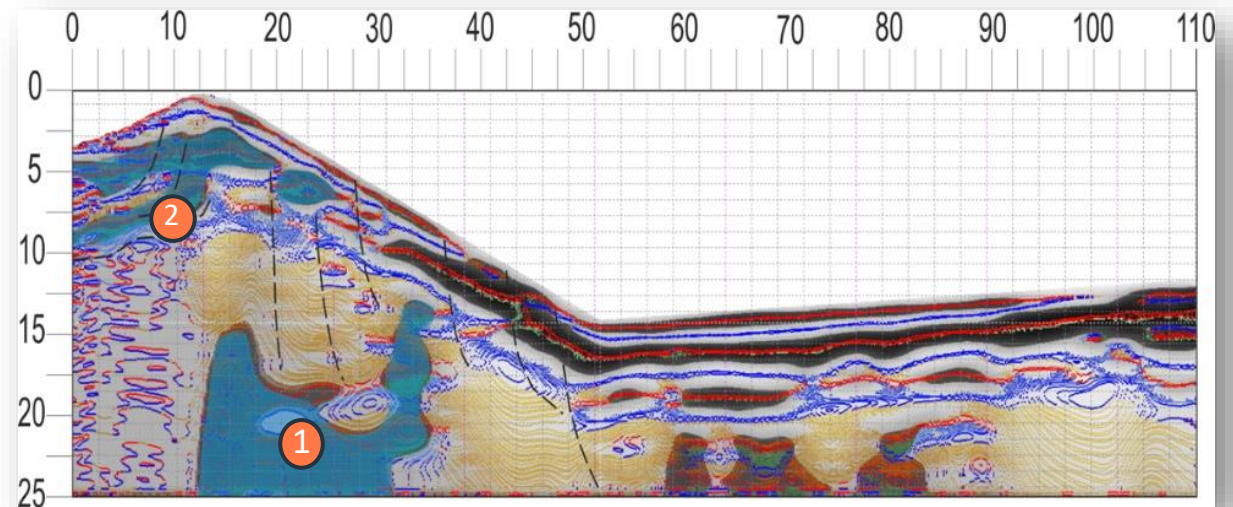


① WATER SATURATION ZONE ② ZONES OF SUFFOSIA

The data obtained were used for comparison with drilling data and for calculating the stability of an engineering structure with a service life of more than 50 years.

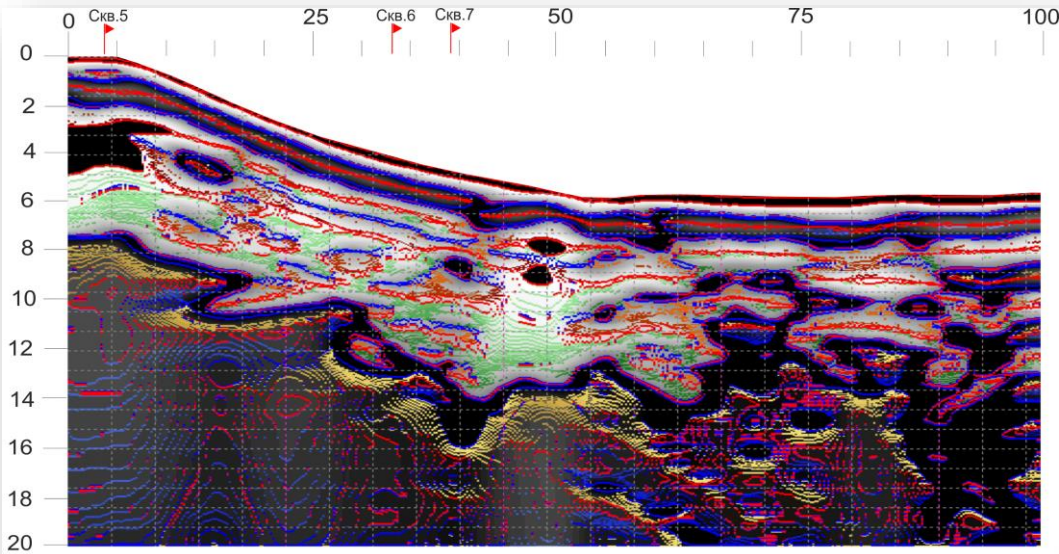
Deep GPR profiling in the cross of the dam revealed:

- ✓ landslide deformations in the rear part of the dam;
- ✓ determine the boundary of the emerging landslide blocks;
- ✓ determine the water saturation zone;
- ✓ determine the sliding surface;
- ✓ subsidence zone.



- Бровка коренного плато;

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The results obtained were used to develop recommendations for carrying out repair and restoration work in order to strengthen the weakened zones and prevent the possibility of a man-made disaster.

Based on the results of complex engineering and geological works using the **LOZA Deep GPR** complex, zones of the development of hazardous geological processes were identified and delineated, which, to a large extent, can have a negative impact on the stability of the dam.

