

AHW017-04

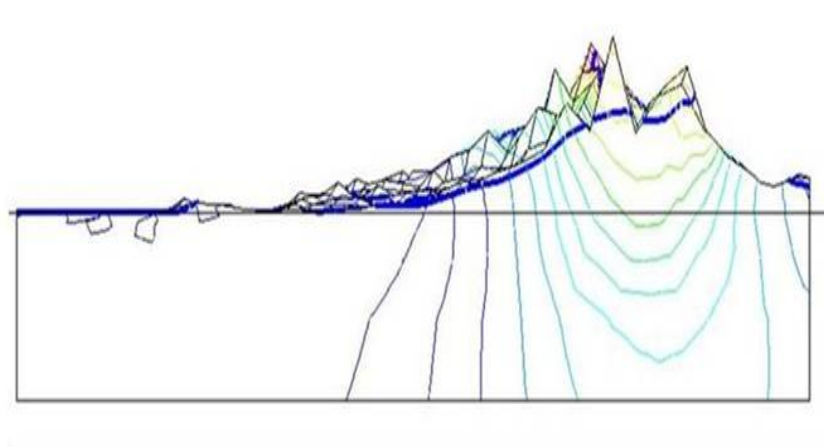
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Groundwater flow analysis of the Kushiro Moor using oxygen and hydrogen stable isotopes and flow analysis

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Potential distribution from Oakan dake to Kushiro Moor

As the Kushiro Moor is the maximum marshland in Japan and is registered by the Ramsar Convention, the Kushiro Moor is an important marshland. However recently the Kushiro Moor becomes dry and vegetation changes and then to establish the cause of the drying of the moor is necessary. Then in this study, water balance analysis was performed comparing with the results of isotope data for river and spring around the Kushiro Moor.

Water balance analysis was performed using flow analysis software G-TRAN/3D (Stratum science laboratory Ltd.).

The stratum on the analytical area was divided into six layers, 0 to 10 m for the first layer, 10 to 60m for the second layer, 60 to 160m for the third layer, 160 to 360m for the fourth layer, 360 to 660m for the fifth layer, and 660 to 1160m for the sixth layer in depth. The used hydraulic conductivities were from 0.001 m/sec for the first layer to 0.00000001 m/sec for the sixth layer.

The used effective porosities were from 0.05 for the first layer to 0.3 for the sixth layer. The altitude data of the analytical area was used as total head. Therefore, under the topographic gradient, the steady state groundwater flow analysis was performed under a saturation condition.

From the isotope data results, spring water in the Kushiro Moor was thought to be derived from the mountainous region at the north of the Kushiro Moor near the Mt. Oakandake.

Some combinations of hydraulic conductivity and effective porosity were examined. As a result, when the first layer of the Kushiro Moor was 0.001 m/sec and the first layer outside the Kushiro Moor was 0.0001 m/sec and the second layer the Kushiro Moor was 0.0001 m/sec and the second layer outside the Kushiro Moor was 0.00001m/sec and the third layer was 0.000001 m/sec and the fourth layer was 0.0000001 m/sec and the fifth layer and sixth layer were 0.00000001 m/sec, the flow analyzed result agreed with the distribution of oxygen and hydrogen isotopes distributions.

Keywords: groundwater flow analysis, oxygen and hydrogen stable isotopes, the Kushiro Moor