

Fish is Leaving Away

Team 2014906

Since the 1950s, the oceans have absorbed more than 93 percent of all the heat that produced by human, which is beginning to show its drawbacks recently. Global warming resulted from the excessive emission of carbon dioxide is also affecting the temperature of the ocean. This may finally cause mass migration campaigns of fish schools, since all the marine organisms tend to move towards more suitable places. To find out how serious this problem will affect fishery in Scottish North Atlantic, our team build several models to predict migration of fish school around Scotland over the next fifty years. In the end, we will propose some solutions.

Is the ocean really becoming warmer in the future?

YES.

Based on current temperature data in July from 2006 to 2019, we use **Gray Forecasting Model** to predict the future change of temperature, together with **Box-Diffusion Model** to add the factor of global warming. The results are compelling since the forecasting outcome from 2006 to 2019 is almost identical to the real situation. According to our model, the trend of temperature change will continue, which may result in the fish migration.

How will the fish schools migrate in the future?

Fish schools near our fishing port now are moving NORTH.

That is exactly what our team are working at. We have proposed a model for predicting the process of fish migration, **Fish Migration Simulation Heuristic(FMSH) Model**, in accordance with the predicted temperature and biological behavior of herring and mackerel. This model is based on the principle that fish will move to a suitable place if their habitat is no longer life-friendly. The solution tells that fish schools are continually moving north. Think about that all the fish schools are leaving your company's range of fishing, and thus the importance is self-evident.

How soon will the fishing industry face dramatic loss?

The arrival of fishing crisis depends on locations of ports.

We considered several fishing regions. Five typical ones are *Orkney*, *Scrabster*, *Buckiem Fraserburgh*, *Peterhead*, which can represent the main part of the fishing industry in Northern Scotland. For these regions, the best is that small fishing companies in Orkney will face economic loss in 2058 as predicted in our model. The worst happens in 2039 at Peterhead where small companies may be unable to harvest. The average of the five is in 2047.

