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 immigration campaign of fish schools, since all the marine organisms tends to move towards suitable place for living.

To find out how serious this problem will infect fishery, our team conduct several models to predicate the immigration of fish school around Scotland. In the end, we will propose some solutions to this problem.

Is the ocean really becoming warmer in the future?

The answer is YES.

Based on current temperature data in July from 2006 to 2019, we use **Gray Forecasting Model** to predict the change of temperature in the next 50 years, together with **Differential Equation** to add the factor of global warming. The prediction is compelling since the forecasting outcome from 2006 to 2019 is almost identical to the real situation. Through our model, the prediction shows the trend of temperature change will continue, which may result in the fish immigration.

How will the fish schools immigrate 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 Immigration Simulation Heuristic(FISH) 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 scope of fishing and you will definitely realize the importance of this problem.

When will fishing industry face economic loss in the future?

The arrive of fishing crisis depends on the geographic position of ports.

We considered several cases for small fishing companies who are more fragile facing finantial impact. Five typical cases are Orkney, Scrabster, Buckiem Fraserburgh, Peterhead regions, who can present the main part of fishing industry in the North of Scotland. Among these regions, the best case is that small fishing companies in Orkney will face economic loss in 2058 as predicted in our model. The worst case happens in 2039 at Peterhead where small companies may be unable to catch fish schools. The average of five cases is in 2047.