

## **What is happening in the Arctic will affect us all**

*Fr. Seán McDonagh, SSC*

Because of global warming the Arctic is warming and thawing. Since 1980, the rise in annual average temperature in the Arctic has been twice that of the rest of the world. In fact, the period between 2005 and 2011 has been the warmest ever recorded in the Arctic. Scientists basing such judgements on data based on lake sediment, tree rings and ice cores which support the claim that the Arctic summer temperature during the past decade, has been the highest in 2000 years. Furthermore, as the Fifth Assessment Report on the Intergovernmental Panel on Climate Change (IPCC) has stated that most of the observed increase in temperature is due to humans burning fossil fuel.

Scientists have recently become aware that parts of the cryosphere – ice and snow - is now interacting with the climate system itself and, thereby, causing further warming. These special connections are sometimes referred to as ‘feedback loops.’ The feed back loop involving the *albedo* effect of snow has been understood for a number of decades, but it is only in recent times that the evidence of feedback from the depletion of sea-ice has come to the attention of scientists. As the temperature in the Arctic increases this causes the sea ice to thaw. The extra heat of the sun is stored and later released which causes even more melting and thawing. The extent of sea ice in summer in the Arctic has shrunk dramatically during the past 30 years, especially the past 10 years. In fact, the decline in sea ice has happened much faster than computer models predicted just a few years ago. The Greenland Ice Sheet contains 3 km<sup>2</sup> of ice. If this were to melt completely, which is not expected in the next few thousand years, this would add 7 metres to the levels of the oceans. But at the moment more melt-water is entering the sea from the Greenland Ice Sheet and this is contributing to a rise in sea levels. More than 200 million people live in places that are less than one metre above sea level. People living in low-lying areas such as Bangladesh and Holland are vulnerable to more frequent storm surges and flooding and, of course, people living in Pacific islands such as Tuvalu are in danger of being completely submerged.

Snow is a major feature of the Arctic region. In recent years scientists have found that the area covered by snow has diminished as is the length of time that

snow lies on the ground. Over the past 50 years, the area covered by snow has decreased by almost one fifth and the snow melt in Spring is happening earlier, especially in area close to the sea. The loss of sea ice is a major problem for polar bears because they can no longer hunt ringed seals. As a result the polar bear population is expected to drop dramatically in the coming years as the area of sea ice diminishes. Tiny species of plankton live in the waters close to the edge of sea ice. These are important sources of food for birds, fish and whales. So the loss of sea ice has a knock-on effect on many other species.

Permafrost which refers to ground which is permanently frozen is also diminishing. Permafrost temperatures are now 2 degrees Celsius warmer than they were 20 to 30 years ago. Thawing permafrost can lead major changes in the water cycle which will affect many species. One ecosystem called *Palsa Mires* – a special kind of wetland - could easily drain away. *Palsa mires* are important breeding grounds for millions of birds which visit the Arctic each summer. If these ecosystems disappear during the next 30 or 40 years, this will have a huge impact on birds, world wide, especially on waders.