The Man, the Myth, the Legend: Professor Terry V. Callaghan and His 3M Concept

Margareta Johansson, Christer Jonasson,
Mats Sonesson, Torben R. Christensen

INTRODUCTION

During almost half a century, Professor Terry V. Callaghan has been active in polar research focusing on Arctic environment and the ecology of Arctic plants, animals, and ecosystem processes, including ecological responses to changes in climate, atmospheric CO₂ concentrations, and UV-B radiation. Professor Callaghan is an excellent scientist who has carried out outstanding research and he is also a role model for colleagues and young scientists, and an excellent friend. Through his hard work he has made himself a strong and positive reputation within the polar community and beyond.

Professor Callaghan has contributed to and led numerous international scientific synthesizing processes. He was a member of the United Nations Environment Programme's expert panel on Stratospheric Ozone Depletion Effects for many years (Zepp et al. 1998, 2003), he was a lead author of the Intergovernmental Panel on Climate Change Polar and Ecosystems Chapters (Anisimov et al. 2007) as well as of the Millennium Assessment of Ecosystems' Polar Chapter (Chapin et al. 2005). He has also been a major contributor to the Arctic Climate Impacts Assessment (ACIA 2005; Callaghan et al. 2005) and the Snow, Water, Ice, Permafrost in the Arctic Report (Callaghan et al. 2011a, b). In addition, Professor Callaghan is the coordinator of SCANNET¹ and its large EU infrastructure program INTERACT² that now includes activities at over 40 research stations throughout the Arctic.

Professor Callaghan's contribution to Arctic research has been recognized at a high level. In 2007 he was included in the group award of the Nobel Peace Prize, and in 2011 he was personally awarded the Vega Medal by the King of Sweden. Professor Callaghan's achievements in Arctic research in general are eminent, but it is for his

outstanding work as the Director of the Abisko Scientific Research Station between 1996 and 2010 that we would like to honor him with this Festschrift.

Professor Callaghan first visited the Abisko Scientific Research Station in 1973. Already from the beginning Professor Callaghan initiated collaborative projects with many senior and young researchers. He encouraged both Swedish and international colleagues and students to establish projects in the Abisko area. He attracted and supervised many PhD students and was successful in obtaining financial support from both domestic and international sources. His thorough knowledge of scientific methods, his brilliant and inventive mind that thinks unconventionally, his humble, friendly, and encouraging approach, his deep sense of humor, are all qualities which explain the attraction and success among colleagues and students.

During the past 10–15 years the Abisko Scientific Research Station has become an international hub for the planning and execution of ecological projects related to climate change in the Arctic. The role of Professor Callaghan for the scientific progress at the Station cannot be overestimated. Under his leadership the number of scientific papers and the number of scientists establishing projects and collaborative works in the area have been steadily increasing and hence also the international visibility of the Station. There are few Arctic researchers that have not heard about the Abisko Scientific Research Station and its activities.

¹ www.scannet.nu.

² www.eu-interact.org.

Fig. 1 The 3M (Monitoring, Manipulation, and Modeling) concept represents three research angles that in a joint effort are pivotal for better understanding environmental changes and to better predict future changes

THE 3M CONCEPT

During his time as the Director, Professor Callaghan has initiated many world-leading new ways of conducting experimental ecosystem studies. Amongst those are manipulations to simulate future climate change in the Arctic. Professor Callaghan also adopted the concept called the 3Ms, Monitoring, Manipulation, and Modeling (Fig. 1), that represents three research angles that in a joint effort are pivotal for better understanding environmental changes and to better predict future changes. *Monitoring* data are used to obtain information on decadal scale changes in a given parameter and may be used to validate output from models. Data from *manipulation* experiments can be used to understand causes of changes and the processes behind. In addition, the manipulation data can provide short term monitoring and can be used to refine future monitoring as it will highlight important and sensitive parameters. Finally, *modeling* can be

used for retrospective analysis and to predict future conditions. Modeling output can identify the sensitivity of different parameters and can provide guidelines on what parameters to manipulate and monitor in the field.

THIS SPECIAL REPORT

This Special Report is dedicated to Professor Callaghan to honor his outstanding contributions to Arctic research in general but in particular as the Director of the Abisko Scientific Research Station by presenting papers according to his 3M concept. Hence, this special issue presents papers on monitoring (Jonasson et al. 2012; Hedenäs et al. 2012; Körner 2012; Christensen et al. 2012), on manipulations (Michelsen et al. 2012; Cornelissen et al. 2012; Bokhorst et al. 2012; Gwynn-Jones et al. 2012; Keuper et al. 2012), and finally, papers on modeling (Miller and Smith 2012; Yang et al. 2012; Hein et al. 2012).

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AUTHOR BIOGRAPHIES

Margareta Johansson (✉) is a scientist at Lund University and at the Royal Swedish Academy of Sciences. She specializes in permafrost dynamics in relation to climate change and its impact on ecosystems.
Address: Department of Physical Geography and Ecosystem Science, Lund University, Sölvegatan 12, 223 62 Lund, Sweden.
Address: Royal Swedish Academy of Sciences, PO Box 50005, 104 05 Stockholm, Sweden.
e-mail: margareta.johansson@natekol.lu.se

Christer Jonasson is an Associate Professor in Physical Geography and Station Manager for the Abisko Scientific Research Station. His major research interest is within present day geomorphological processes in particular and their dependence on extreme events and climate change.
Address: Royal Swedish Academy of Sciences, PO Box 50005, 104 05 Stockholm, Sweden.
Address: Swedish Polar Secretariat, Abisko Scientific Research Station, 981 07 Abisko, Sweden.

Mats Sonesson is Professor Emeritus of Plant Ecology at the Lund University, Sweden, and the Royal Swedish Academy of Sciences. His major research interest is ecophysiology of northern mosses and lichens.
Address: Harald Blåtands gränd 13, 224 77 Lund, Sweden.

Torben R. Christensen is Professor at the Department of Earth and Ecosystem Sciences, Lund University, Sweden. He specializes in how vegetation and ecosystem processes respond and provide feedback effects on climate under changing environmental conditions.
Address: Department of Physical Geography and Ecosystem Science, Lund University, Sölvegatan 12, 223 62 Lund, Sweden.
Address: Greenland Climate Research Centre, Greenland Institute of Natural Resources, Box 570, 3900 Nuuk, Greenland.