permafrost
cci

# CCI+ PHASE 2 – NEW ECVS
## PERMAFROST

# D3.2
# CLIMATE RESEARCH DATA PACKAGE RELEASE NOTE

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**PREPARED BY**

b·geos GAMMA REMOTE SENSING UiO : University of Oslo

AWI UNI FR UNIVERSITÉ DE FRIBOURG UNIVERSITÄT FREIBURG West University of Timisoara TERRASIGNA

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## Author team

Sebastian Westerman, GUIO

Tazio Strozzi, GAMMA

Annett Bartsch, B.GEOS

ESA Technical Officer:

Frank Martin Seifert

EUROPEAN SPACE AGENCY CONTRACT REPORT

The work described in this report was done under ESA contract. Responsibility for the contents resides in the authors or organizations that prepared it.

# TABLE OF CONTENTS

# 1 INTRODUCTION

## 1.1 Purpose of the document

This document is a cover for the Climate Research Data Package (CRDP) for the Permafrost project produced in Phase 2 of ESA's Climate Change Initiative CCI+.

## 1.2 Document Status of the document

This is the first issue of the CRDP document in Phase 2 of the project, reflecting Version 3 of the Climate Research Data Package.

## 1.3 Preface

Permafrost is an Essential Climate Variable (ECV) within the Global Climate Observing System (GCOS), which is characterized by subsurface temperatures and the depth of the seasonal thaw layer. Complementing ground-based monitoring networks, the Permafrost CCI project is establishing Earth Observation (EO) based products for the permafrost ECV spanning the last two decades. Since ground temperature and thaw depth cannot be directly observed from space-borne sensors, a variety of satellite and reanalysis data are combined in a ground thermal model. The algorithm uses remotely sensed data sets of Land Surface Temperature (MODIS LST/ ESA LST CCI) and landcover (ESA Landcover CCI) to drive the transient permafrost model CryoGrid 2, which yields thaw depth and ground temperature at various depths, while ground temperature forms the basis for permafrost fraction.

## 1.4 Temporal coverage

CRDPv3 covers the years from 1997 to 2021, with the data available for each year of the period.

## 1.5 Spatial Coverage

CRDPv3 pertains Arctic and High-Mountain permafrost environments, extending from 85°N down to 35 °N latitude in the North America and down to 25 °N in Asia.

The projection is in geographic coordinates at 0.01° resolution.

### 1.6 Data availability and release

CRDPv3 will be made available through the CCI Data Portal (http://cci.esa.int/data). At time of writing this document, the Permafrost Team liaises with the CCI Data Portal Team for obtaining the DOI, setup the associated landing pages, and transfer data files to the Data Portal.

### 1.7 Acronyms

| | |
|---|---|
| AWI | Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research |
| B.GEOS | b.geos GmbH |
| CCI | Climate Change Initiative |
| CRDP | Climate Research Data Package |
| ECV | Essential Climate Variable |
| EO | Earth Observation |
| ESA | European Space Agency |
| GAMMA | Gamma Remote Sensing |
| GUIO | Department of Geosciences University of Oslo |
| SU | Department of Physical Geography Stockholm University |
| UNIFR | Department of Geosciences University of Fribourg |

# 2 EXAMPLES

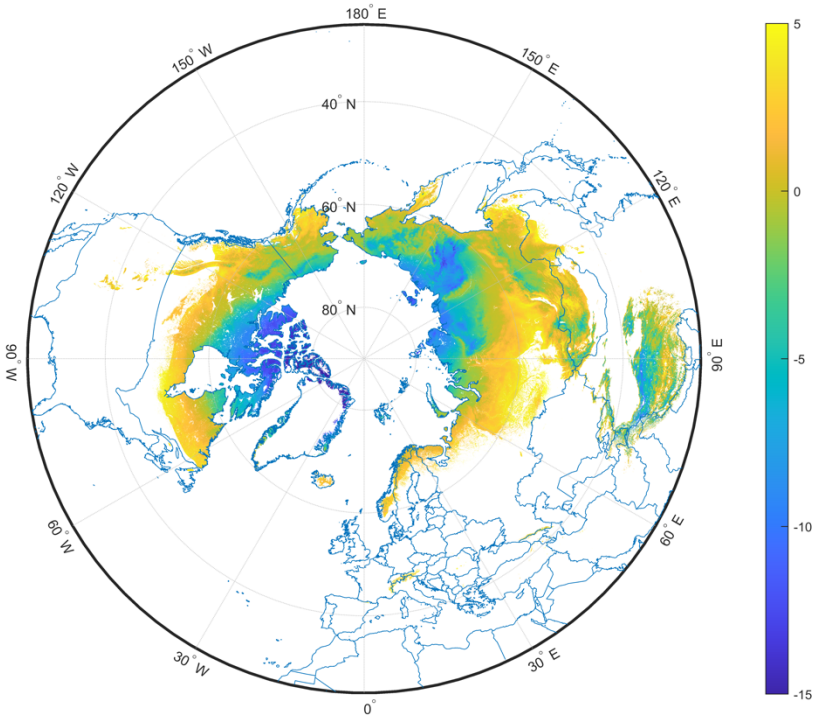


*Figure 1: Example of Mean Annual Ground Temperature at 2 m depth in 2019 (in °C, color axis).*

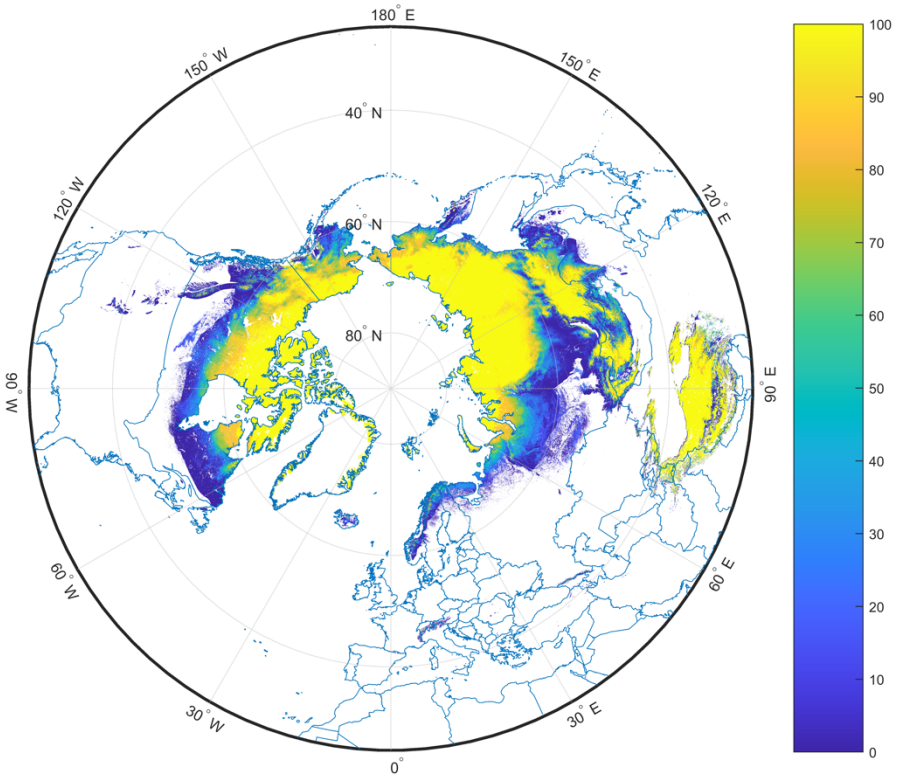


*Figure 2: Example of Active Layer Thickness for 2019 (from 0 to 100%, color axis).*