KINDRA DELIVERABLE D2.4

DATASHEETS

Summary:

This document provides information on the KINDRA project European Inventory of Groundwater Research (EIGR) metadata statistics focused on the General overview of the metadata (quantity and type), Research and Knowledge class 1-4 classification and HRC-SYS (Operational actions, Societal challenges, Research topics) together with Technological and Policy readiness level overview. Records inserted into the EIGR until end of December 2016 have been considered.

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1. INTRODUCTION

One of the main objectives of the KINDRA project is the Europe-wide assessment and data collection of existing groundwater-related practical and scientific knowledge focusing on international (in EU dimensions), national and regional activities in a format suitable for further use even after the objectives of the project will be achieved.

Hydrogeology-related knowledge has been reported in an online European Inventory of Groundwater Research (EIGR) with open access for researchers and the public. This work has been implemented by the Project Partners together with European Federation of Geologists Linked Third Parties (20 National Associations) participating in the project. They put together the scattered hydrogeology-related information from diverse sources, consulting at national level the relevant reports and databases of universities, research centres, government bodies, territorial administrative offices and other parties involved in hydrogeology research, using the terminology and the guidelines created in WP 1.

This document provides the information on the KINDRA project European Inventory of Groundwater Research (EIGR) metadata statistics focused on the General overview of the metadata (quantity and type), Research and Knowledge class 1-4 classification and HRC-SYS (Operational actions, Societal challenges, Research topics) together with Technological and Policy readiness level overview. Records inserted into the EIGR until end of December 2016 have been considered.

2. STATISTICS OVERVIEW

The following section provides insight to overall data inserted into the EIGR over the past six months. It comprises inputs from Project Partners as well as European Federation of Geologists Linked Third Parties (20 National Associations) participating in the project.

2.1. BASIC INFORMATION

The data insertion into the EIGR has been significantly increased over the last six month starting from 184 (status on 15 June 2016) to 1865 (status on 31 December 2016) with tendency of further increase since the data input is still an ongoing process (Table 1; Figure 1). The difference of 245 metadata between the total mentioned here (1865) and one mentioned in D2.3/Table 1 (1620) refers to metadata inserted by Partners, while in D2.3 Country reports only metadata inserted by LTPs were considered.

Table 1. Quantity of EIGR entries by particular EIGR user in the period June-December 2016.

EIGR USER	CONTENTS 31/12/2016	CONTENTS 24/11/2016	CONTENTS 21/10/2016	CONTENTS 29/9/16	CONTENTS 21/9/16	CONTENTS 11/8/16	CONTENTS 15/6/16
EFGBELGIUM	29	29	29	29	29	6	6
EFGCROATIA	5	5	5	5	5	5	5
EFGCZECH	773	130	130	125	47	49	49
EFGDENMARK	32	10	10	10	4	6	6
EFGFINLAND	112	96	96	96	50	23	6
EFGFRANCE	97	5	3	0	0	0	0
EFGGERMANY	16	15	13	5	5	5	5
EFGGREECE	14	1	1	1	1	1	1
EFGHUNGARY	13	8	5	5	5	5	5
EFGIRELAND	6	7	7	7	7	7	6
EFGITALY	99	75	71	70	50	50	5
EFGNETHERLANDS	52	46	46	46	37	35	35
EFGPOLAND	50	12	5	5	5	5	5
EFGPORTUGAL	58	8	8	8	8	5	5
EFGSERBIA	98	6	6	5	5	5	5
EFGSLOVENIA	62	5	5	5	5	5	5
EFGSPAIN	51	5	5	5	5	0	0
EFGSWITZERLAND	0	0	0	0	0	0	0
EFGUKRAINE	51	8	8	8	6	5	5
EFGUK	2	2	2	2	2	2	2
SAPIENZA	126	90	90	66	50	33	0
GEUS	3	3	3	3	3	3	3
EFG	38	18	18	11	11	11	7
UM	78	51	31	25	16	16	16
TOTAL	**1865**	**640**	**599**	**544**	**358**	**284**	**184**

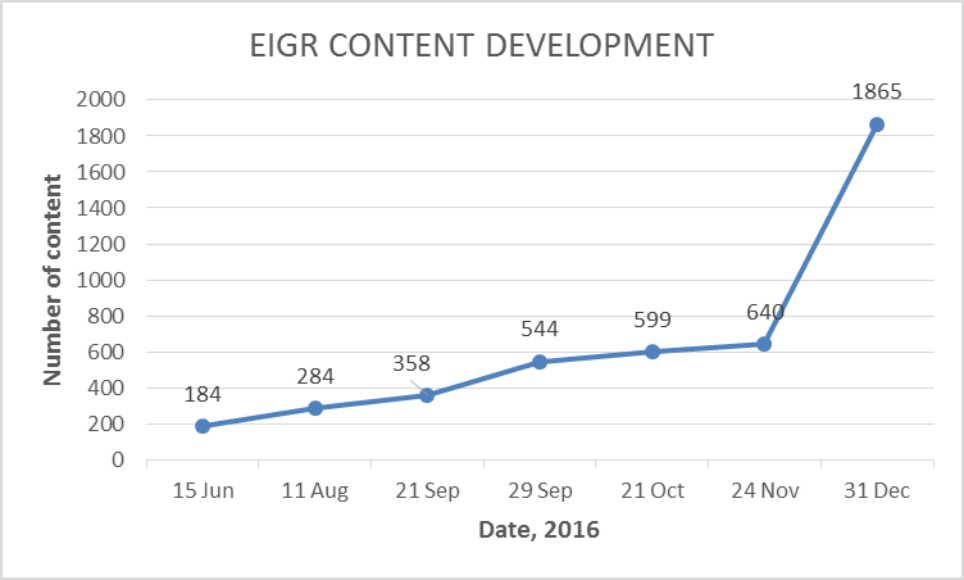

Figure 1. Quantity of the EIGR entries over the period June-December 2016.

The prevalent type of metadata uploaded to the EIGR, based on the data from Deliverable 2.3/Table 3, are hydrogeology related reports (47.6%) followed by scientific papers from international and national scientific journals, popular journals, newsletters and quality assured or reviewed papers (26.4%) and other publications such as conference proceedings (Figure 2). Databases and maps correspond to the publicly available national hydrogeological documents covering together 7.4% of the total metadata. The scarcity of the technical reports is mostly due to the ownership barriers.

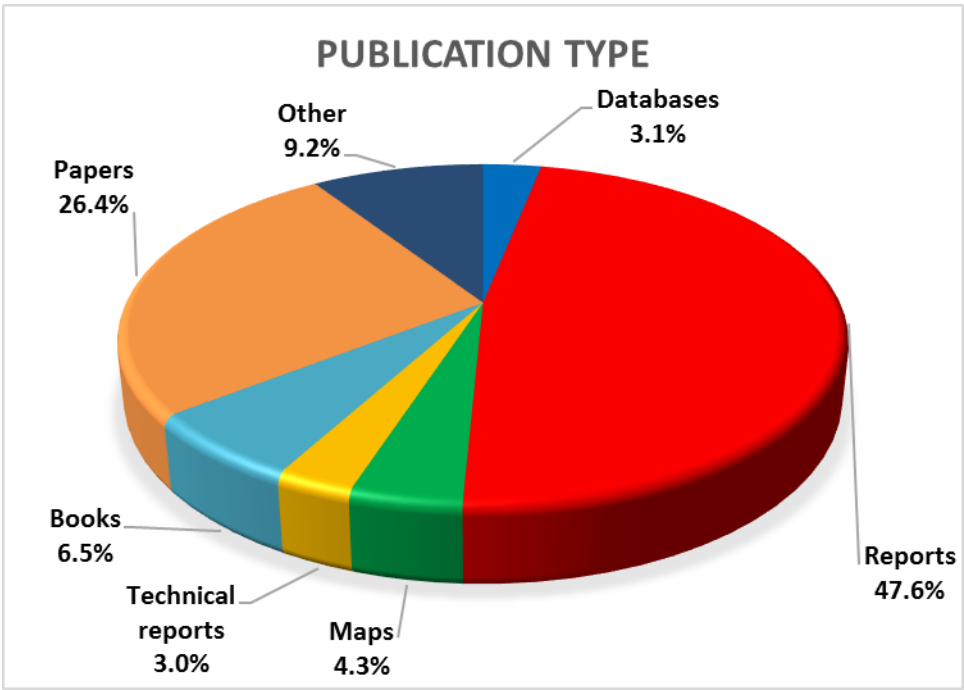

Figure 2. Type of metadata uploaded to the EIGR.

2.2. HRC-SYS CLASSIFICATION

The main feature of the classification system developed by KINDRA is the grouping of relevant research according to the overarching categories which consist of 5 operational actions; 5 societal challenges; and 5 research topics.

2.2.1. Operational actions

For operational actions, the selection was made according to keyword searches in Web of Science, Scopus, Google Scholar, selected groundwater science journals and EU directives and guidance; primarily the Water Framework Directive, the Groundwater Directive and the Blueprint to Safeguard Europe's Water Resources as well as the KINDRA questionnaires completed by the 20 experts of national geological societies/the European Federation of Geologists. The overarching operational actions selected were:

a) Mapping;
b) Monitoring;
c) Modeling;
d) Water supply;
e) Assessment and Management.

From the total of 1865 metadata, 1481 have been classified according to this indicator. The majority of the EIGR metadata belong to the Assessment and Management (59.1%) followed by Modeling and Monitoring (together 28.7%) (Figure 3). At the moment, 384 records have not been classified by this indicator.

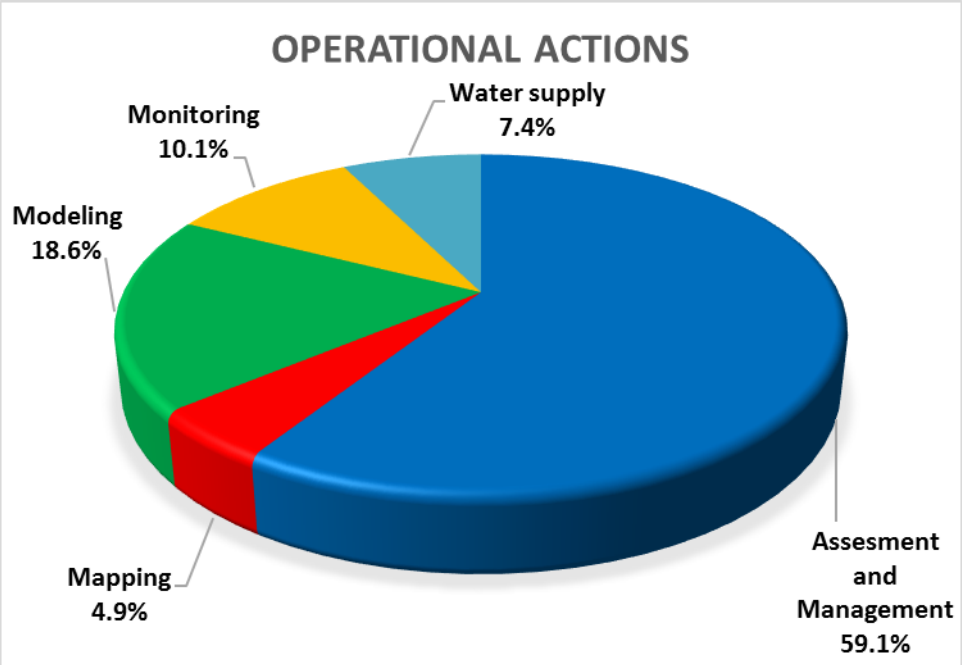

Figure 3. Distribution of the EIGR metadata related to Operational actions.

2.2.2. Societal challenges

For societal challenges the references were taken from the Horizon 2020 EU Framework Program for Research and Innovation, in order to make the classification as relevant as possible to the main challenges of the EU research programs, and to facilitate the evaluation of groundwater research importance within the context of the Horizon 2020 challenges and visions. This has resulted in the following five societal challenges for groundwater research classification and evaluation:

a) Health;
b) Food;
c) Energy;
d) Climate/Environment/Resources;
e) Policy/Innovation/Society.

From the total of 1865 metadata, 1480 have been classified according to this indicator. The majority of the EIGR metadata belong to the Climate, Environments and Resources comprising 89.6% of the metadata (Figure 4). At the moment, 385 records have not been classified by this indicator.

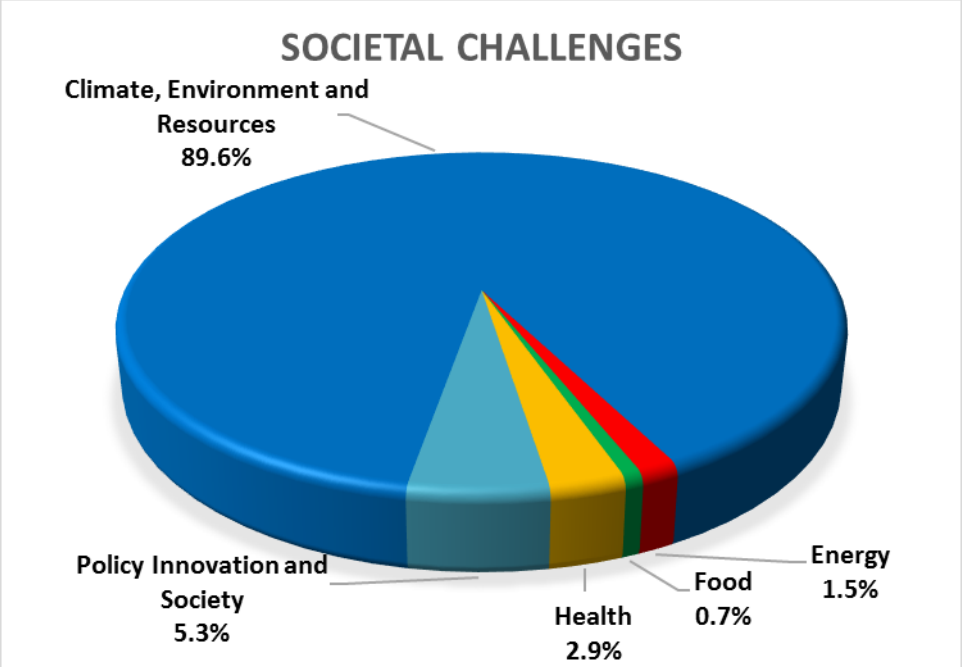

Figure 4. Distribution of the EIGR metadata related to Societal challenges.

2.2.3. Research topics

The selection was based on the most important general research topics and operational actions in relation to the major natural science disciplines or research topics to which groundwater research primarily belongs and relates:

a) Biology;
b) Chemistry;
c) Geography;

d) Geology;
e) Mathematics and Physics.

From the total of 1865 metadata, 1482 have been classified according to this indicator. The majority of the EIGR metadata belong to the Geology comprising 83.5% of the total metadata (Figure 5). At the moment, 383 records have not been classified by this indicator.

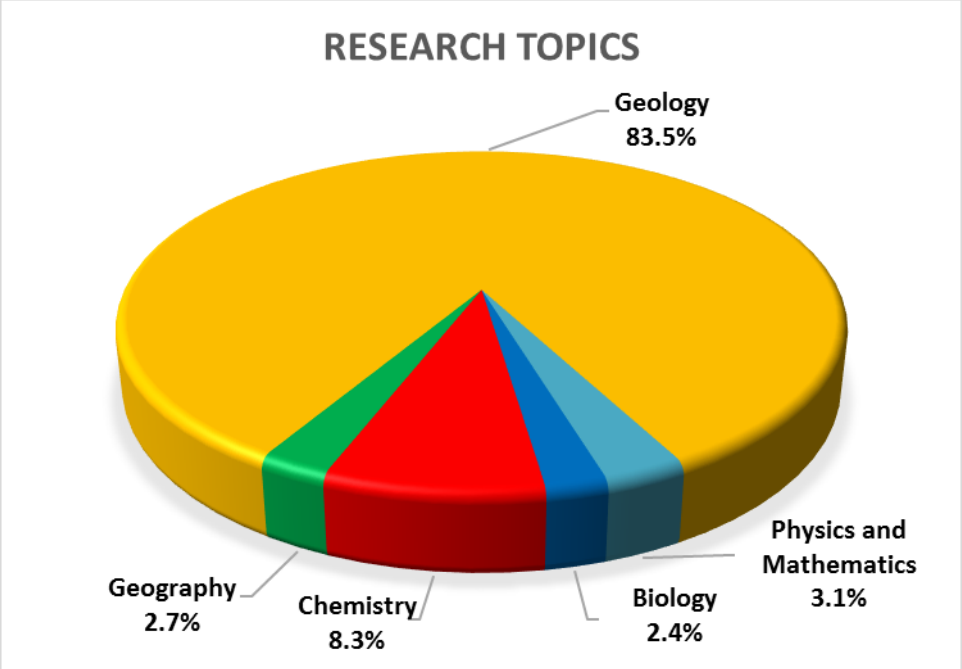

Figure 5. Distribution of the EIGR metadata related to Research topics.

2.3. RESEARCH AND KNOWLEDGE CLASSES

In this section, which is directly linked with the Hydrological Research Classification System, users indicated the type of knowledge classes to which the resource belongs to ad according to the following predefined categories:

1) Class-1-Research: Peer-reviewed papers (in Web of Science or Scopus and High Quality Assessment);
2) Class-2-Research: Non-Peer-reviewed papers (Books, Proceedings and others searchable in Web of Science or Scopus and High Quality Assessment);
3) Class-3-Knowledge: Quality assured or reviewed papers (not included in WoS or Scopus but Quality Assessed);
4) Class-4-Knowledge: Non reviewed papers (Projects, Maps, others).

From the total of 1865 metadata, 1448 have been classified according to this indicator. The majority of the EIGR metadata was defined as Class-4: Non reviewed papers (54.3%), followed by Class-1: Peer-reviewed papers (24.7%) (Figure 6). At the moment, 417 records have not been classified by this indicator.

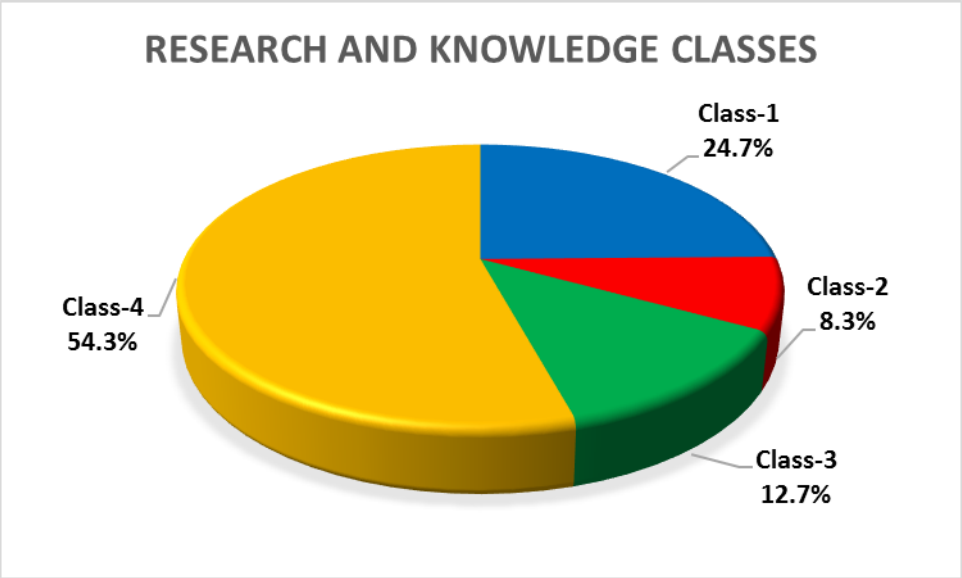

Figure 6. Type of metadata based on research and knowledge classes.

2.4. TECHNOLOGICAL READINESS LEVEL (TRL)

Description of the Technology Readiness Level (from TRL1 to TRL9, as classified by the European Community) was included as additional indicator for estimating technology maturity of a product/publication. The product/publication inserted had to be assigned to one of the following levels:

a) TRL 1: Basic principles observed;
b) TRL 2: Technology concept formulated;
c) TRL 3: Experimental proof of concept;
d) TRL 4: Technology validated in lab;
e) TRL 5: Technology validated in relevant environment (industrially relevant environment in the case of key enabling technologies);
f) TRL 6: Technology demonstrated in relevant environment (industrially relevant environment in the case of key enabling technologies);
g) TRL 7: System prototype demonstration in operational environment;
h) TRL 8: System complete and qualified;
i) TRL 9: Actual system proven in operational environment (competitive manufacturing in the case of key enabling technologies; or in space).

From the total of 1865 metadata, 1310 have been classified according to this indicator. The majority of the inserted EIGR products/publications have been classified as TRL9-Actual system proven in operational environment followed by TRL1-Basic principles observed (Figure 7). At the moment, 579 records have not been classified by this indicator.

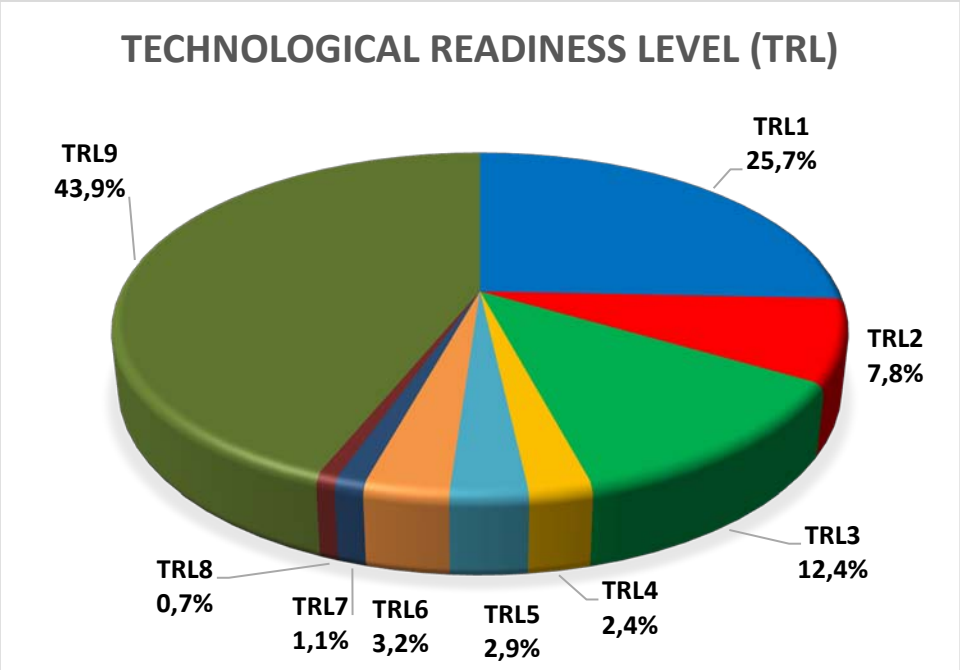

Figure 7. Distribution of the EIGR metadata related to Technological readiness level.

2.5. POLICY READINESS LEVEL (PRL)

Description of the Policy Readiness Level (from PRL1 to PRL4) was additionally included as indicator for estimating the policy maturity of a product/publication. The product/publication inserted had to be assigned to one of the following levels:

a) PRL 1: Not relevant for EU policy implementation;
b) PRL 2: Potentially relevant for EU policy but additional research needed;
c) PRL 3: Relevant for implementation of EU policy, basic research conducted but guidance need to be developed;
d) PRL 4: Guidance available: ready for implementation of EU.

From the total of 1865 metadata, 1131 have been classified according to this indicator. The majority of the EIGR products/publications belong to PRL2-Potentially relevant for EU policy but additional research needed (Figure 8). At the moment, 734 records have not been classified by this indicator.

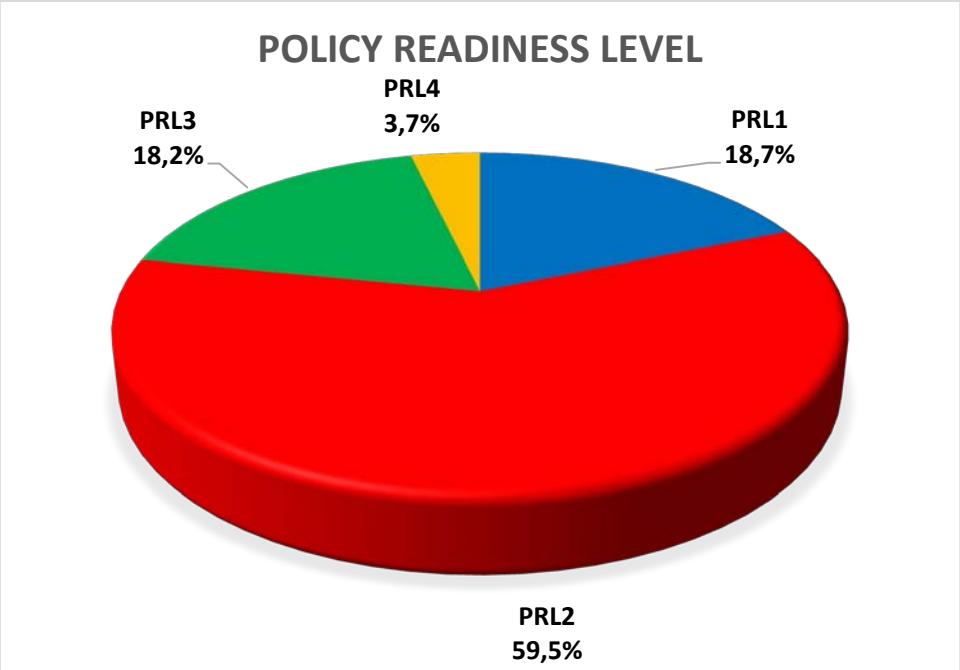

Figure 8. Distribution of the EIGR metadata related to Policy readiness level.

3. CONCLUSIONS

The data insertion into the EIGR has been increasing over the last six month ranging from 184 (status on 15 June 2016) to 1865 (status on 31 December 2016). The statistics presented here led to the following conclusions:

1) The prevalent data type inserted into the EIGR are hydrogeological reports (47.6%) followed by scientific papers from international and national scientific journals, popular journals, newsletters and quality assured or reviewed papers (26.4%);
2) According to the Operational actions classification scheme, the majority of the EIGR metadata belong to the Assessment and Management (59.1%);
3) According to the Societal challenges classification scheme, the majority of the metadata belong to the Climate, Environments and Resources including more than 80% of the total metadata;
4) According to the Research topics classification scheme, the majority of the metadata belong to the Geology including more than 80% of the total metadata;
5) More than half of the EIGR metadata was defined as Class-4 category (54.3%);
6) More than 40% of the products/publications have been classified as TRL9-Actual system proven in operational environment;
7) The majority of the products/publications have been classified PRL2-Potentially relevant for EU policy but additional research needed (59.5%);

Additional increase of the metadata quantity is expected, since the data input is still an ongoing process.