

**JOINT WMO/IOC TECHNICAL COMMISSION FOR OCEANOGRAPHY AND MARINE METEOROLOGY (JCOMM)  
EXPERT TEAM ON SEA ICE (ETSI)**

**Seventh Session  
Geneva, 13 May to 15 May 2019**

**Summary and action items**  
final (2019-07-15)

Item	Summary	Action/ Recommendations	Responsible	End Date
<b>1. Opening of the meeting</b>				
1.1 Opening	Welcoming remarks were given by ETSI Chair Dr. Vasily Smolyanitsky and by the WMO Secretariat.	—		
1.2 Adoption of the agenda	The Agenda was adopted, and logistics for the meeting was agreed.	—		
1.3 Working arrangements	Working arrangements were explained	—		
<b>2. WMO Updates</b>				
2.1 Report of the ETSI chair	Chair explained ETSI group work (concept schema) on – GMDSS Polar components, Polar Code, Integrated Ice Services, ENC/ECDIS and GCW/CryoNet/ArcRCC. ETSI was re-established by JCOMM-5 resolution 12.2/4, Chair went through terms of reference for the ETSI. ETSI WP for 2017-2021 was explained.	—		
2.2 WMO Reform and future of JCOMM	Secretariat provided some background about the Reform, together with foreseen decisions of the 18 <sup>th</sup> World Meteorological Congress in this regard. Relevant aspects to the ETSI were discussed. ETSI should bring all its concerns to the knowledge of the JCOMM Management Committee. There is reference also to the agenda item 8 in these minutes.	Proposals to the JCOMM Management Committee about the role of the ETSI after reform, should be prepared	ETSI Chair / all members	ASAP
2.3 WMO Executive Council Polar and High Mountain Research and Services (EC-PHORS)	Secretariat went through minutes from the EC-PHORS meeting and pointed out relevant issues to ETSI. There is draft document 6.1/4 in CG-18 documents explains issues regarding Polar regions	Provide link to the minutes of the EC-PHORS to the ETSI members. ETSI need to interact intensively with EC-PHORS regarding WMO reform.	Secretariat  Chair / ETSI members	ASAP

2.4 WMO Congress – relevant documents	Secretariat explained shortly about the relevant documents. It was also explained documents can be found from WMO web pages. Strategic Plan for WMO, WMO Technical Commissions and other bodies, Ocean Dialogue, Polar and High Mountain Activities (all relevant documents has not been published yet). ETSI will provide comments to the Congress Documents in near future and comments will be annexed to the minutes.	ETSI comments to the CG-18, Comments will be an annex to these minutes. ETSI members are engorged to contact their national delegations if appropriate	Chair / All ETSI members	20 <sup>th</sup> May 2019
<b>3. Review of sea ice guidance documents and other related documentation</b>				
3.1 Sea ice best practices from the members	<p>The Team reviewed concise reports from the members summarizing the new practices from the Services, including:</p> <p><b>Argentina:</b> Report included status and changes on ice and iceberg charting, sea Ice model support and improvement. SIGLAC and SIGLAC-C observations software were implemented for ice observations in Antarctica for Argentina. The Service is also trying to implement the SIGLAC-C by IAATO. Manual for Ice Observers finalized (Spanish version so far). Near future objectives are: Produce ice charts in SIGRID3 and S-411 formats, change Sea ice Model for weekly updates, Iceberg chart upload at PolarView web site.</p> <p><b>Canada:</b> Following items were underlined for national practices:</p> <ul style="list-style-type: none"> <li>❖ close follow of the Manual of Ice (MANICE) and Manual of Standard Operational Procedures For preparing and issuing Marine Forecasts and Warnings (MarPro)</li> <li>❖ balance between client need for detail and limitations of charts (quantity of eggs, resolution)</li> <li>❖ need to educate clients on differences between forecasts and analyses</li> <li>❖ improved digital offerings would alleviate many of the noted issues.</li> </ul> <p><b>Chile:</b> Following items were underlined for national practices:</p> <ul style="list-style-type: none"> <li>❖ Ice limits and concentration charts in B/W and colors for the Antarctic Peninsula, with iceberg location and coastal subsets, using the egg code (based on NATICE sources).</li> <li>❖ Glaciological reports taken in situ from the Antarctic Bases.</li> <li>❖ Satellite images mosaics of MODIS and SENTINEL.</li> <li>❖ Numerical weather forecasts on maps, soundings, meteograms and text, based on GFS-WRF-NWW3.</li> </ul>	Consider proposed reports for updating the WMO-574	Chair / All ETSI members	31 <sup>st</sup> August 2019

	<ul style="list-style-type: none"> <li>❖ Voluntary Observation Ships (VOS) recruited within Chile Navy supporting vessels (CCAQ, CCMF, CCOV)</li> <li>❖ English version and light web page of the Chile Navy Weather Service <a href="http://meteoarmada.directemar.cl">http://meteoarmada.directemar.cl</a> including some external links.</li> </ul> <p><b>Denmark:</b> DMI provides operational regional ice charting for support of shipping in Greenland and Northwest Atlantic Waters, using WMO agreed standards. The primary data input is routine access to Synthetic Aperture Radar data from space. The output is produced by a team of ice analysts and is exported to SIGRID3 and pdf maps using WMO terminology and display.</p> <p><b>Finland:</b> The FMI Ice Service is maintaining its services, since Finland's trade is highly dependent on the year-round marine transport. The main users are the Finnish and Swedish icebreakers, Finnish and Swedish icebreaking authorities and the icebreaking companies. Since the winter 2017/2018 FMI and SMHI ice services have produced the general daily ice chart in co-production. Each ice service takes weekly turns in doing the ice analysis, handing over the task to the other institute from Monday to Tuesday. The chart is labelled as a joint product and looks the same regardless of which ice service has made the analysis. Medium range ice forecasts are provided to Finnish icebreakers, Finnish icebreaking authorities and the pilotage. This service includes 10-day forecasts of ice condition development, issued on a weekly basis (Wednesday), and web conference briefings twice a week (Mondays and Thursdays). Seasonal ice forecasts are produced once a month, starting in October, giving estimations on the prevailing ice conditions at the end of each winter month. Coastal radars are used in real-time ice monitoring as FMI has equipped three radars along the Finnish coast with ice detection hardware. These data are also distributed to the icebreaking. Ice charts, ice reports and ice forecasts: <a href="http://www.iceservice.fi">http://www.iceservice.fi</a> and <a href="http://ice.fmi.fi">http://ice.fmi.fi</a>.</p> <p><b>Germany:</b> No larger changes in the German Ice Service have happened since last meeting. The planned transition from Arcmap to QGIS in the ice chart production and the modernization and opening of the ice database (mostly station and fairway data of the whole Baltic) were delayed but planned to happen before the 2019/2020 ice season of the Baltic.</p>			
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	<p><b>Japan:</b> Brief JMA's current status on sea ice service such as analysis and numerical prediction of sea ice distribution and condition was provided by the national expert including the JMA's operational analysis of sea ice using mainly satellite data</p> <p><b>Norway:</b> Following items were underlined for national practices:</p> <ul style="list-style-type: none"> <li>❖ Arctic ice charting every weekday (all year), Antarctic every (April-October), GMDSS-XIX (and -I) as text lines.</li> <li>❖ A number of development projects: KEPLER (kepler-polar.eu), ExtremeEarth (arthanalytics.eu), ARCSAR (arcsar.eu), CIRFA (cirfa.uit.no), Sentinel4ThinIce, Bifrost and Ice Watch ASSIST (icewatch.gina.alaska.edu).</li> <li>❖ Doubling number of staff.</li> </ul> <p>Highlights included:</p> <ul style="list-style-type: none"> <li>❖ KEPLER - Planning evolution of EU Copernicus programme for Polar Regions monitoring.</li> <li>❖ ExtremeEarth - Development of machine learning and AI-based techniques for sea ice mapping.</li> <li>❖ Ice Watch ASSIST - Shipboard observations protocol and database utilising Citizen Science.</li> </ul> <p><b>Russia:</b> The major drivers for extension of the services for the Russian Ice Services are start of continuous year-round navigation of the new Arc7 LNG carriers in the western part of the NSR, overall increase in transportation through the NSR including sea-river operations in Laptev Sea, transit voyages and increased demands to sea ice information in the Sakhalin waters.</p> <p>The new services include:</p> <ul style="list-style-type: none"> <li>❖ daily ice charting for the western segment of the NSR (Kara and Barents Seas)</li> <li>❖ Iceberg targets monitoring in the Kara and Laptev Seas in a form of text messages and annotated imagery</li> <li>❖ Integrated hourly – daily observations, ice products and services for Ob estuary</li> <li>❖ Twice weekly risk assessment for the NSR for the NSRA</li> <li>❖ Enhanced ENC services for Sakhalin waters</li> </ul> <p>Most of the services for the Arctic region including GMDSS support for METAREAs XX, XXI are implemented in AARI and partially in the Northern and Yakutsk departments of Roshydromet, products for the Pacific region, including METAREA XIII and Southern Seas (Caspian,</p>			
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	<p>Azov) are also provided by Research Center Planeta, Hydrometcenter Moscow and other marine regional department of Roshydromet. The Antarctic ice services include hemispheric weekly tabular icebergs analysis and bi-weekly sea ice analysis, all implemented within the collaborative AARI-NIC-NIS project on the Southern Ocean sea ice analysis. Routine products are available at the AARI websites (<a href="http://www.aari.ru">www.aari.ru</a>, <a href="http://wdc.aari.ru">wdc.aari.ru</a>, <a href="http://ice.aari.ru">ice.aari.ru</a>, <a href="http://gmdss.aari.ru">gmdss.aari.ru</a>) and the NSRA website (<a href="http://nsra.ru">nsra.ru</a>).</p>			
3.2 Sea-Ice information services in the World (WMO-No.574)	<p>Briefs on the current status of the publication were provided by the ETSI Chair. Information in the present publication is updated until summer 2017. External review was done by summer 2018 by the Secretariat and information was updated by the Vasily Smolyanitsky and Caryn Panowicz. After discussion it was decided that updates can still be made.</p>	<p>Secretariat will contact all countries mentioned in the publication and ask check, update and if appropriate delete the information. Chile is asked to add information. Copyrights for the images need to give to the WMO by members.</p>	Chair / Secretariat	June 2019.
3.3 WMO Sea Ice Nomenclature vol. 1, 2 and 3 (WMO-No.259)	<p>Briefs on the current status of the publication for all 3 constituent volumes were provided by the ETSI Chair. In this content, the Chair presented the recently completed (March 2019) Russian national Atlas for Ice Formations where all 3 volumes of the Sea Ice Nomenclature are published with a full update of Volume II, the Illustrated Glossary now containing modern colourful photos for practically all terms. Further the Team discussed a proposal for 4 new terms on platelet ice proposed by a joint team led by AWI expert Mario Hoppman. Vasily Smolyanitsky proposed to approve new terminology (see attachment). Proposal was accepted.</p>	<p>Addition to terminology Terminology will be published in English, Russia, French and Spanish once available. ETSI will use Russian Atlas for Ice formations as a model to update Volume II</p>	<p>Secretariat/ ETSI Chair</p> <p>Chair</p>	<p>July 2019</p> <p>2020</p>
3.4 SIGRID-3 (JCOMM-TR-023)	<p>Briefs on the current status of the publication were provided by the ETSI Chair and Norway. Most members are working with Revision 3 (2014). Uncertainties are presently not included in the standards but most likely be one of the first candidates for update, though this would be a difficult task mainly because of lacking resources. Note from the Secretariat: Term "Southern Ocean" should not be used in the UN family. Instead term "Antarctic area" or "Antarctic Waters" should be used.</p>	<p>Waiting results from the IICWG Task team about uncertainties to update SIGRID-3 Revisit technical changes proposed by 6th ETSI session and incorporate them in</p>	<p>Task team</p> <p>ETSI Members</p>	<p>November 2019</p> <p>July 2019</p>

		next version of SIGRID-3 format.		
3.5 Ice chart colour standard (JCOMM-TR-024)	Briefs on the current status of the publication were provided by Denmark. At the moment version 1.1 is valid. There are some colour codes missing like icebergs, risk values etc. New Ice Charts should be put in to the Annex. New Iceberg Products could be presented in the International Symposium on Extreme Maritime Weather: Towards Safety of Life at Sea and Sustainable Blue Economies (London, 23 to 25 October 2019)	Feedback from Colour code should be asked from customers. Input to the International Symposium on Extreme Maritime Weather: Towards Safety of Life at Sea and Sustainable Blue Economies (London, 23 to 25 October 2019)	ETSI Members Chair / Vice Chair / Keld	December 2019 October 2019
3.6 Ice information in ENC/ECDIS	Briefs on the current status of the publication were provided by the ETSI Chair and Germany. The IHO webpage s100.iho.int has now a very good and updated information the full family of the S100 standards. It is recommended to use these pages for information. S-411 is based s-100 version 0.9. At the moment version 4.0 is used. There is a lot of rewriting to do. For night presentation all colours except black and white can be used. There is proposal of colours used at the night presentation.	Roadmap (attached) has already everything needed. Target dates need to be updated. Reporting to IHO and IMO at the International Symposium on Extreme Maritime Weather: Towards Safety of Life at Sea and Sustainable Blue Economies (London, 23 to 25 October 2019) Develop technical update for S-411 on landmask, day/night presentation, transparency and projections.	ETSI Chair	October 2019
<b>4. Sea-ice capacity building</b>				

4.1 Ice Analysts Competency	Briefs on the current status of the competencies were provided by Canada. International Ice Charting Working Group task team has been working on a set of standardized competencies for ice forecasters and analysts. Ice Analysts Competency framework has been developed. Task team was seeking ETSI approval to the work done. ETSI endorsed the work done by the Task Team. WMO Standards need to be part of the course. Ice Forecasters Competency framework has been developed. ETSI endorsed the work done by the Task Team and documents were approved in general. WMO Standards need to be part of the course.	Documents need to be tide up by WMO secretariat.	Scott Weese, Secretariat	December 2019
4.2 Ice analysis and forecast resources	ETSI reviewed different ice analysis and forecast resources in particular by Argentina, Germany, Norway. ETSI endorsed all the presented documents.	Provide summaries for resources.	Argentina, Germany, Norway other services who are providing resources	September 2019
4.3 Training in sea ice analysis	ETSI members were invited to review and summarize the existing training resources. ETSI noted the importance of organizing next Ice Analyst Workshop.	Provide summaries for training resources.	Those who provided resources	September 2019
<b>5. Polar Code implementation</b>				
5.1 National practices in risk assessments	The Team reviewed national implementation of the Polar Code provided by Russia and Denmark (attached to the minutes of the meeting),			
5.2 White paper on Polar Code implementation	Index for possible White Paper on Polar Code was developed (attached to the minutes). Advice from the International Maritime Organization (IMO) and GCW was taken into account.	Develop the White Paper on Polar Code	Chair, Vice Chair, Keld, Alvaro	October 2019
<b>6. GMDSS implementation in Polar regions</b>				
6.1 National practices for polar METAREAs	National practices are reviewed, including: Russia, Argentina, Norway, Canada, and Denmark; www.weather.gmdss.org is introduced as a safety tool; the information to display on Navtex is discussed.	METAREA coordinator are reminded that amount of information should not be driven by the cost		
6.2 Updates on GMDSS guides and manuals	3 new IMO documents were recommended from Osamu (IMO), Annex 8 -11. All three are relevant to e-navigation. The Team reviewed the documents and agreed to provide necessary input to IMO jointly with the Secretariat.	Review IMO recommended document	Alvaro SCARDILLI, Keld QUISTGAARD,	September 2019

&WMO/IHO/IMO joint activities		Develop missing text for IMO doc 6/23 add 1 paragraphs 13.7 and 13.8 with deadline for submission to IMO NCSR7 15/10/2019 Develop proposal to amend SOLAS Chapter V rules 5 and 6	all ETSI members, Secretariat	
6.3 New techniques for promulgation of GMDSS information	Briefs on the new techniques for promulgation GMDSS information were provided by the ETSI Chair with additional comments from the IMO expert. That includes 101-11.doc from IMO describing the new SafetyCAST based on IRIDIUM satellite system. The 101-11 doc was sent to all MSI providers. Current action for the Ice Services is now get connected to relevant Metareas and initiate testing of the new system including the new proposed C-cods for the bulletins.	Develop rules for using new C-code in the planned SafetyCAST system to get benefit of the new techniques Connect to IHO (Peter Doherty) and initiate testing of the SafetyCAST During the testing period of SafetyCAST estimate its costs and efficiency in comparison to SafetyNET	ETSI Chair and Vice Chair, Scott Weese, all ETSI members	2020
<b>7. Sea Ice information systems</b>				
7.1 Sea ice operational portals	ETSI discussed about different operational sea ice portals. Common understanding was that these portals are useful. Iceberg Service was the most important one to discuss From the Polar View there was no special comments. Copernicus has different services listed. The Team noted that the Ice Logistics portal is the only one approved by Arctic Council.	Investigate the inclusion of forecast charts into the Ice Logistics portal	ETSI Vice Chair, Alvaro Scardilli, Nick Hughes	
7.2 Connection to JCOMM ETOOFS (video-link)	The Copernicus Marine Environment Monitoring Service (CMEMS) was explained by Pierre Bahurel through video link. Noted presentation given. Also noted developments in these products. There was a discussion about the parameters and what parameters should be used. It was also mentioned that term product should be used rather than term	Provide these concerns to the Tom Cuff and to the JCOMM Management Committee	Chair	ASAP



	service. ETSI noted benefits of the new products for the ice analysts but a great concern was raised if these products will be turned into a service made available to the end users and not just ice service providers.			
7.3 Sea ice climatology	Briefs on the status of the WMO Global Digital Sea Ice Data Bank project were provided by the ETSI Chair. The chair noted that the project was initiated in 1989 by the former WMO CMM and presently holds the vastest collection of the sea ice charting material in SIGRID 1,2 and3 exchange formats spanning period 1933-present. Collection is available at AARI (wdc.aari.ru) and to lesser extent at NSIDC (nsidc.org). ETMC-7 meeting report was given by Alvaro Scardilli from Argentina. Meeting documents are at the JCOMM website. ETSI members were encouraged to use AARI WDC Sea Ice file server as an information source.	Presenting ETSI work at the ETCM meetings AARI pages to be advertised to the Companies running search engines	Alvaro Scardilli ETSI Chair	Continuing
<b>8. Interaction with WMO programmes</b>				
8.1 Global Cryosphere Watch	Rodica Nitu from the WMO Secretariat gave presentation about Global Cryosphere Watch. Presentation is attached to the minutes. The Team further held a discussion about developing the project and getting new partners for GCW	ETSI members to follow and participate this project actively. Contact Polar Space Task Group and other Space Agencies and insure active participation in sea ice intercomparison project	All Nick Hughes, Keiji Hamada, Secretariat	
8.2 Polar Regional Climate Centres	ETSI Chair briefed results of the 3rd Pan-Arctic Climate Outlook Forum (PARCOF3) and noted essential input of JCOMM ETSI to seasonal review section. Presentations are attached to the minutes. Discussion was held about the interaction with ArcRCC-N and future AntRCC-N. Activities were noted.	Active involvement from ETSI members to these activities including verification of the seasonal forecasts. Investigate usability and usefulness of the outlooks and other information provided Propose action items for next PARCOF. It will be held (virtually) October 2019.	ETSI members	

8.3 International Ice Charting Working Group (IICWG)	Discussion on interaction with IICWG. It was noted that at the moment interaction includes only through the projects of the ETSI WP though inside IICWG there are now different task teams. Hence, most of the work needs to be done inside the task teams. ETSI noted that there is need for organising a new Ice Analyst Workshop. This should be jointly organized by IICWG, WMO/ETSI and IOC. Workshop should be organized during 2020. Remote access should be provided for the workshop.	Start discussion with partners about the meeting.	Patrick Eriksson / all ETSI members	May 2019
8.4 Sea Ice Services in the new WMO Structure	There will be two technical commissions after possible reform in the WMO. ETSI work is partly under both of these possible new commissions. ETSI sees its position fully inside the services commission even part of the work falls under both commissions. ETSI also noted that connection with IOC needs to be taken into account. There must be co-operation and good contacts with IOC also in the future. ETSI asked for a possibility for WMO/WDS to mention ETSI activities in the possible services inf. Document for cg-18. ETSI especially asked to mention the mature nature of the ETSI services.	Prepare document for WMO secretariat and also provide extended version to national delegations for the future work regarding reform.	All ETSI members	May 2019
<b>9. Other partners</b>				
9.1	Discussed activities included the following. Arctic Council / PAME web pages there are to be hyperlinked at the WMO and JCOMM web resources. Descriptions should be checked and if necessary, the PAME be asked to update them. IHO S-101 and S-411 and work with satellite issues are important for ETSI. WMO is responsible for the entries to the IHO register of ice registers. Technical work is done at the moment under JCOMM umbrella. IMO/WMO symposium is important part of co-operation. Planned contribution for IMO also includes WMO white paper on Polar Code.	Check information inside Arctic Council /PAME web pages.  Presentation for the Symposium	ETSI members  ETSI Chair and Vice Chair	
<b>10. Other issues</b>				
10.1	Historical information about Ice Charts is valuable and access to the data is important. It is also important to keep collecting data.  Propose updated terms of reference for ETSI in connection with possible WMO Reform	Mandate for Ice Chart information  Update terms of reference	Secretariat  ETSI Chair and Vice Chair, Secretariat	December 2019  Summer 2019
<b>11. Review of action items</b>				
11.1	The meeting report was reviewed and action items and timelines agreed by the participants.	The Meeting Report will be posted to the	WMO	June 2019

		ETSI page at <a href="http://www.jcomm.info/ETSI">www.jcomm.info/ETSI</a>		
<b>12. Closure of the session</b>				
	Meeting was closed on Wednesday, May 15 <sup>th</sup> at 15:30 p.m.			

**Participants:**

**JCOMM ETSI:**

Keld QUISTGAARD	Denmark
Patrick ERIKSSON	Finland
Keiji HAMADA	Japan
Jürgen HOLFORT	Germany (Vice-Chair)
Nick HUGHES	Norway
Alejandro DE LA MAZA	Chile (attending remotely)
Alvaro SCARDILLI	Argentina
Vasily SMOLYANITSKY	Russia (Chair)
Scott WEESE	Canada

**JCOMM SFSPA:**

Antonio REPUCCI, Mercator Ocean	France (attending remotely)
Pierre BAHUREL, Mercator Ocean remotely)	France (ETOofs Chair, attending remotely)

**Invited experts:**

Osamu MARUMOTO remotely)	IMO Secretariat (attending remotely)
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**Secretariat:**

Etienne CHARPENTIER	WMO Secretariat
Champika GALLAGE	WMO Secretariat
Tero JOKILEHTO	WMO Secretariat
Rodica NITU	WMO Secretariat
Zhichao WANG	WMO Secretariat
Irene Sanz ZOYDO	WMO Secretariat

