

## Agenda Item for Consideration by ARHC

ARHC2-09B

### 2nd Arctic Regional Hydrographic Commission Meeting Copenhagen, Denmark, September 28-29, 2011

#### Datum in the Greenlandic area

<i>Submitted by:</i>	<i>Denmark</i>
<i>Executive Summary:</i>	<i>To inform about the challenges with datum in the Arctic area</i>
<i>Related Documents:</i>	<i>None</i>
<i>Related Projects:</i>	<i>None</i>

#### Introduction / Background

The purpose of this paper is to inform the conference about the use of chart datum's or the lack of datum's in charts in the area around Greenland, it also describes the foreseen challenges and the need to investigate whether there are similar challenges in the other Arctic countries and if deemed appropriate, to discuss if there is a need for distributing a paper to IHO informing about the challenge's concerning the use of datum and to generate recommendations from an Arctic perspective. Furthermore, the conference is invited to discuss if the technical WG could contribute with their expertise dealing with technical issues/recommendations.

#### Analysis/Discussion

The introduction implementation of chart datum WGS-84 in paper charts and ECDIS seems to be well implemented on a world-wide scale. The WGS-84 datum seems to be the one used by mariners and is the only approved datum in the ECDIS specification by IMO in the ECDIS specification. The challenge is: what do we as a Hydrographic Office dealing with the Arctic area do to ensure the users of our products are aware of the situation in the Arctic and how should they deal with it? This paper does not deal with the presentation of ENC in ECDIS and land maps, but only with paper chart.

#### Description of the situation in Greenlandic waters

Paper charts in Greenland can be divided in four groups: older paper charts covering the southern part of the West coast which is the area with the most traffic, and covered with the majority of paper charts. These are produced in Mercator projection with the datum Qornoq 1927. These older paper charts will in the period from now to the end of 2018 be replaced with improved and corrected new paper charts and changed to the datum WGS-84. The East coast and the northern part of the West coast are in a Mercator projection but without a well defined datum. The northern part is covered with one chart in Lambert conformal projection. In addition to this there are problems with the

absolute accuracy in the old maps. Even in the charts with well defined datum (Qornoq 1927) the errors are up to 1 km.

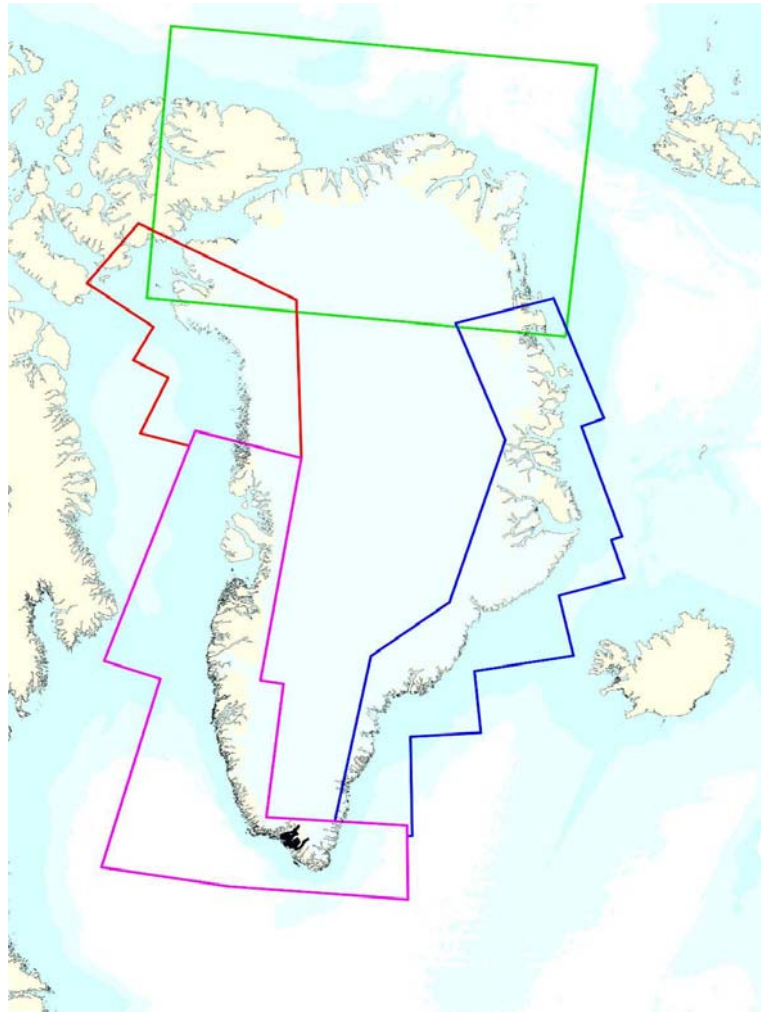
**Fig. 1.**  
**Paper charts covering Greenland**

*Magenta frame:*  
Qornoq 1927 (new charts WGS 84).

*Blue frame:*  
Data is in Mercator without datum.

*Red frame:* Qornoq 1927

*Green frame:*  
Lambert conformal conical projection (no datum defined).



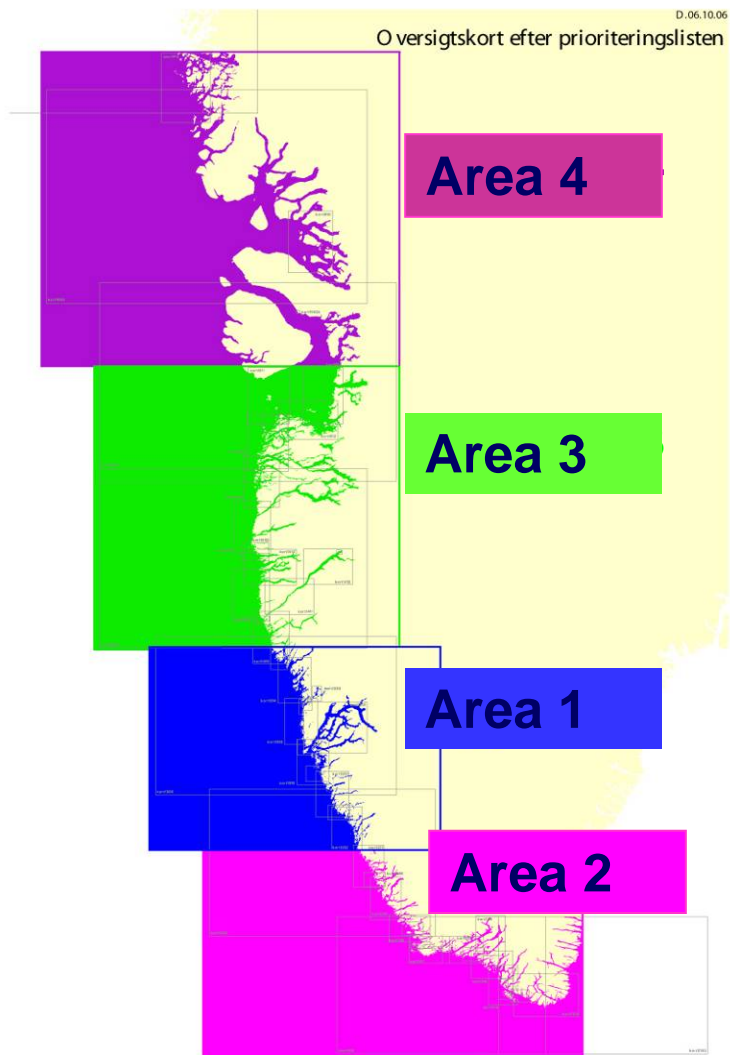
The Danish Ministry of Environment has signed an Agreement with the Self Government of Greenland. It is agreed that KMS shall improve 65 paper charts (of a total of approx. 100 paper charts) including the production of new electronic charts, to be completed by the end of 2018. The area for the improvement of the paper charts covers the southern part of the west coast of Greenland.

The implementation of new improved paper charts is prioritised and divided in to four areas. with the area number one as the first area to be improved and area number four as the last.

### **Challengers with shift of datum or lack of datum.**

Mariners sailing in Greenlandic waters have to use a datum in accordance with the datum available in the official charts as a consequence shift datum in there GPS receiver. The ongoing change of datum in charts requires the mariners to focus on datum-shift in positioning between new and old nautical charts, but it also challenges the datum-shift when using unofficial navigation systems (ECS), including:

- Raster charts
- Routes / tracks
- Digitalised data



**Fig. 2.**

Old paper charts will in the period from now to the end of 2018 be replaced with improved and corrected new paper charts and changed from Qornoq 1927 WGS-84.

### Conclusions

Mariners sailing in Greenlandic areas covered by paper charts without a datum, or in datum different from WGS84 are expected to have problems using their GPS or ECDIS for navigation and ECS. Reporting a position in these areas should not be in WGS 84 due to the fact, that it will be impossible to transfer the position in the charts used in the area. If reporting a position, the position should clearly state in which paper chart it is located to or to be given as a bearing and a distance from a clearly distinguished point in an official map, and to be stated which map has been used. It is important to emphasise that a position in Greenlandic waters not is necessary unequivocal and users have to have this in mind.

### Action Required of ARHC

The ARHC is invited to discuss if other MS have similar challenges, and if deemed appropriate, to discuss if there is a need for distributing a paper to IHO about the challenges concerning the use of datum and if there is a need to come up with recommendations from an Arctic perspective. Furthermore, the conference is invited to discuss if the technical WG could contribute with their expertise dealing with technical issues/recommendations. The Conference is invited to take note of the information and, if deemed necessary, to take appropriate actions.