



# Billions of measurements for millions of square kilometres

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**Secretary-General**  
**of the**  
**International Hydrographic Organization**



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Organisation Hydrographique Internationale

## International Hydrographic Organization: History and Constitution

**GET TO KNOW THE IHO** INTERNATIONAL HYDROGRAPHIC ORGANIZATION

*Dedicated to supporting safe navigation and protection of the environment*

<p><b>WHAT WE DO</b></p> <ul style="list-style-type: none"> <li><b>COORDINATE</b> activities among national hydrographic offices</li> <li><b>MAINTAIN</b> uniformity in nautical charts and documents</li> <li><b>ADOPT</b> effective methods of collecting and sharing hydrographic data</li> <li><b>DEVELOP &amp; PROMOTE</b> the field of hydrography and related technologies</li> </ul>	<p><b>MEMBER STATES</b></p> <p><b>89</b></p> <p><b>HEADQUARTERS</b></p> <p><b>MONACO</b> <small>At the invitation of H.S.H. Prince Albert I of Monaco</small></p> <p><b>FIRST CONVENED</b></p> <p><b>1921</b> <small>Following its creation in 1919</small></p>	<p><b>LEADERSHIP</b></p> <ul style="list-style-type: none"> <li>1 Secretary General</li> <li>2 Directors</li> </ul> <p><small>Elected every three years</small></p> <p><b>HYDROGRAPHY</b></p> <p>By mapping water depth, the shape of the seafloor and coastline, and the location of possible obstructions, hydrography helps maintain safe navigation and supports all other marine activities.</p>
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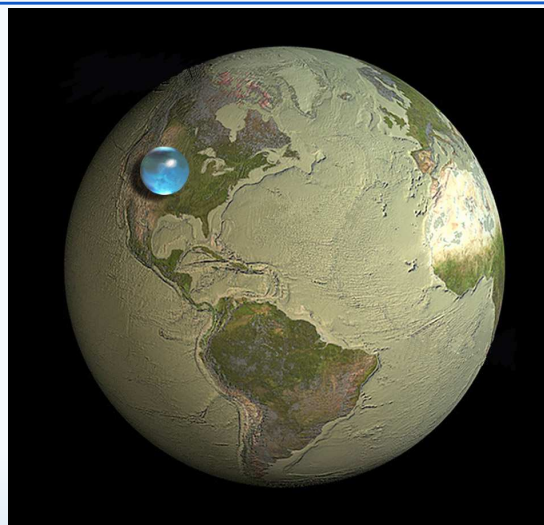
[iho.int](http://iho.int)



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## All waters on earth



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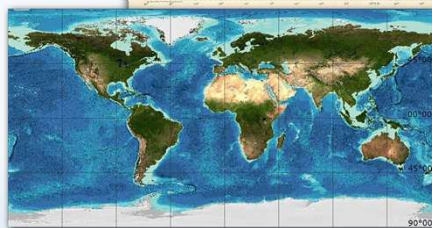
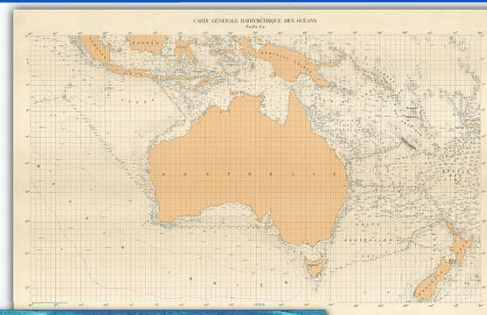
## 20<sup>th</sup> Century idea: GEBCO – General bathymetric map of the oceans

**The first edition** (also known as the Monaco Chart) took just 7 months to compile and was published in 1903. The lithoprinted maps were presented at the Paris Academy of Science in January 1904 and the Eighth International Geographical Congress held in Washington, D.C later in the year.

First Edition based on 18 000 measured depths (soundings).

Five editions of GEBCO printed charts that were produced between 1904 and 1982.

Since the early 1990s, GEBCO has moved to producing and making available digital bathymetric data sets products.



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## But why do we need such charts?

- Broader understanding of global oceanic processes;
- Extended request for marine knowledge by environmentalists;
- Smarter transportation chain for growing transport volumes;
- Extended use of resources of the continental shelf;
- Transoceanic connections through sea cables;
- Mesh up with marine information from other engineering and science domains for a multitude of uses;

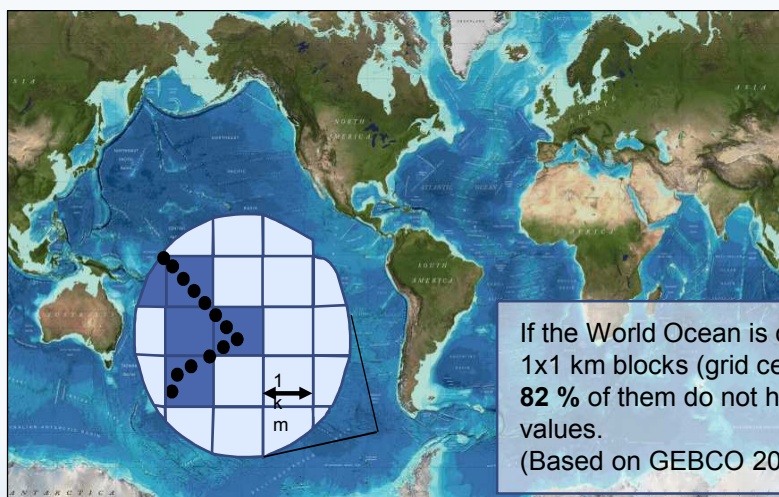


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## Today 18% complete only – tasks us clearly ...



If the World Ocean is divided into 1x1 km blocks (grid cells), about **82 %** of them do not have depth values.  
(Based on GEBCO 2014 grid)



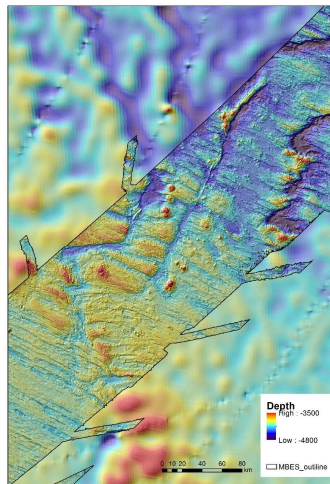
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## ... to achieve greater and better coverage.

Detailed mapping of the MH370 transit areas (1 % of the Indian Ocean) took over 2 years with the effort of one ship.



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## Crowd-sourced Bathymetry Initiative

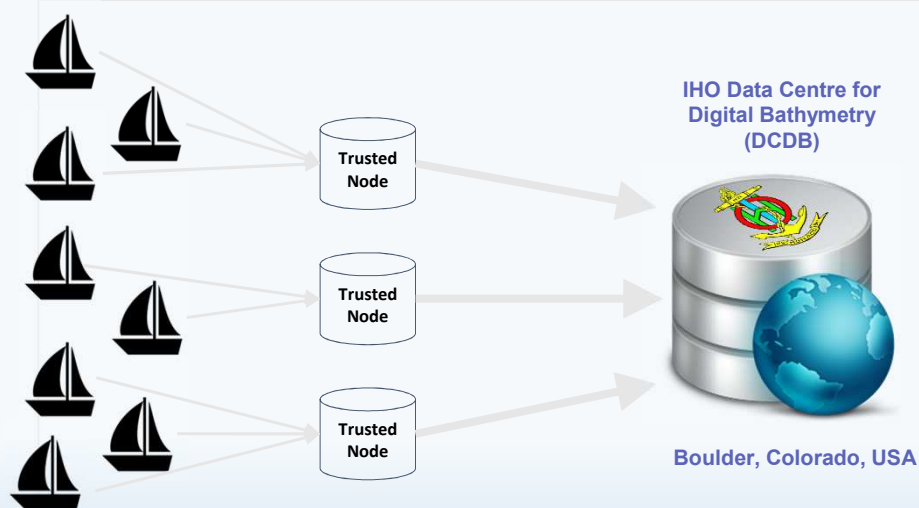
- This Initiative of the International Hydrographic Organization (IHO) aims to motivate mariners and any vessels to collect and share Crowdsourced Bathymetry (CSB) as part of their navigation routes helping seabed mapping efforts.
- CSB is defined as the collection and sharing of depth data (and metadata) measured and collected by non-traditional survey vessels equipped with navigation instruments, while maintaining their usual operations at sea.
- The initiative transforms the long-standing tradition of information share between mariners into the digital era.



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## The CSB Project – Crowd Source Input



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## IHO Data Centre for Digital Bathymetry

- The DCDB was established by the IHO in 1988 to steward the worldwide collection of open bathymetric data.
- The Centre archives and shares, freely and without restrictions, depth data contributed by mariners and others from across the world.
- The DCDB is hosted by the US National Oceanic and Atmospheric Administration's (NOAA) [National Centers for Environmental Information \(NCEI\)](#) in Boulder, Colorado, USA.
- All data hosted by the DCDB is accessible online via interactive web map services.

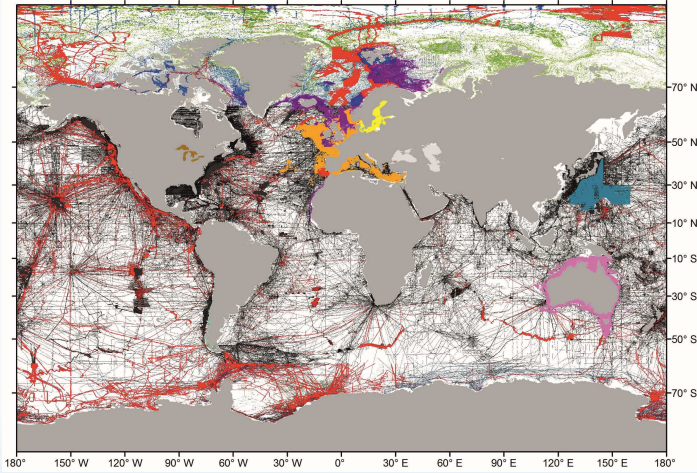


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# CSB Project – Input

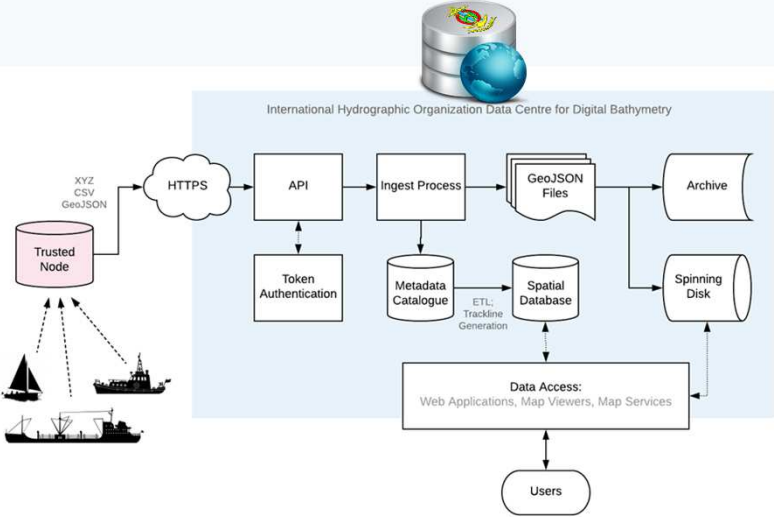


“If we got 1% of all seagoing vessels logging data, and on average they spent half their time at sea, then that’s about **5 billion data points a day.**”

- Tim Thornton, TeamSurv



# CSB Project – throughput



- 117 million soundings
- 110 contributing vessels
- 3435 data deliveries



## Crowd sourcing helps in depths down to 200 m

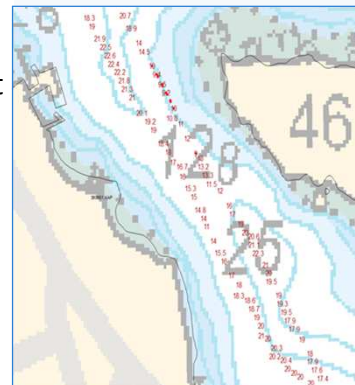
CSB filled in between systematic line spacing in a narrows providing a better limiting depth.



CSB revealed some chart compilation problems.



CSB hinting on faulty measurements used for charting. Area now marked for revisory survey to resolve.



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## Data Submission

The IHO DCDB can accept data via File Transfer Protocol (FTP), e-mail, CD and DVD as well as other mutually agreed upon digital media. Data are preferably in the [MGD77 exchange formats](#), but any well documented format is acceptable.

The IHO Publication B-12 “Guidance on Crowdsourced Bathymetry” provides more technical details.

### Mailing Address:

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## CSB is relevant but so is expert sourcing too!



<https://maps.ngdc.noaa.gov/viewers/csb/index.html>

All sorts of offshore industry including pipelines and cable layers can do a great deal of contribution



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## Conclusion

- Any data is better than no data;
- Collect bathymetric data wherever and whenever possible;
- Release data held in archives, at lower resolution if necessary;
- Not all data are appropriate for charting but all data of use to somebody in some way.

The IHO serves the global maritime community since almost 100 years and has a goal to fill the gaps of the oceans together with other international organizations and stakeholders.



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... to complete our image of the earth.

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*“And seas but join the regions they divide”*

*Alexander Pope (English poet, 1688 – 1744)*

... and that's it. Thank you for listening  
and fruitful discussion.

A handwritten signature in blue ink that reads "Matthias Jonas". The signature is written in a cursive style with a checkmark-like flourish at the end.

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