Notes

SO… WHAT IS *HYDROSPATIAL*?

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Abstract

In the Article "What's *Hydrospatial*?" (Hains, 2020a), it was suggested to adopt a new term to distinguish the past analog hydrographic production chain for the present digital hydrographic data centricity, and differentiate from broader terrestrial datasets. Following the publication of this Article as a Note in the International Hydrographic Review, some people including some of the authors of this article reached out to the author of the first Article to express their divergent views with the term Hydrospatial (Hains 2020 ; Jonas 2021 ; Jonas 2020; Ponce 2020 ; Pang & Oei 2020 ; Ponce 2019) and even considered it possibly misleading.

The intent of this second article, *"So… What is Hydrospatial?* is to engage a broader community to join the conversation on Hydrospatial and reach out to clarify its definition.

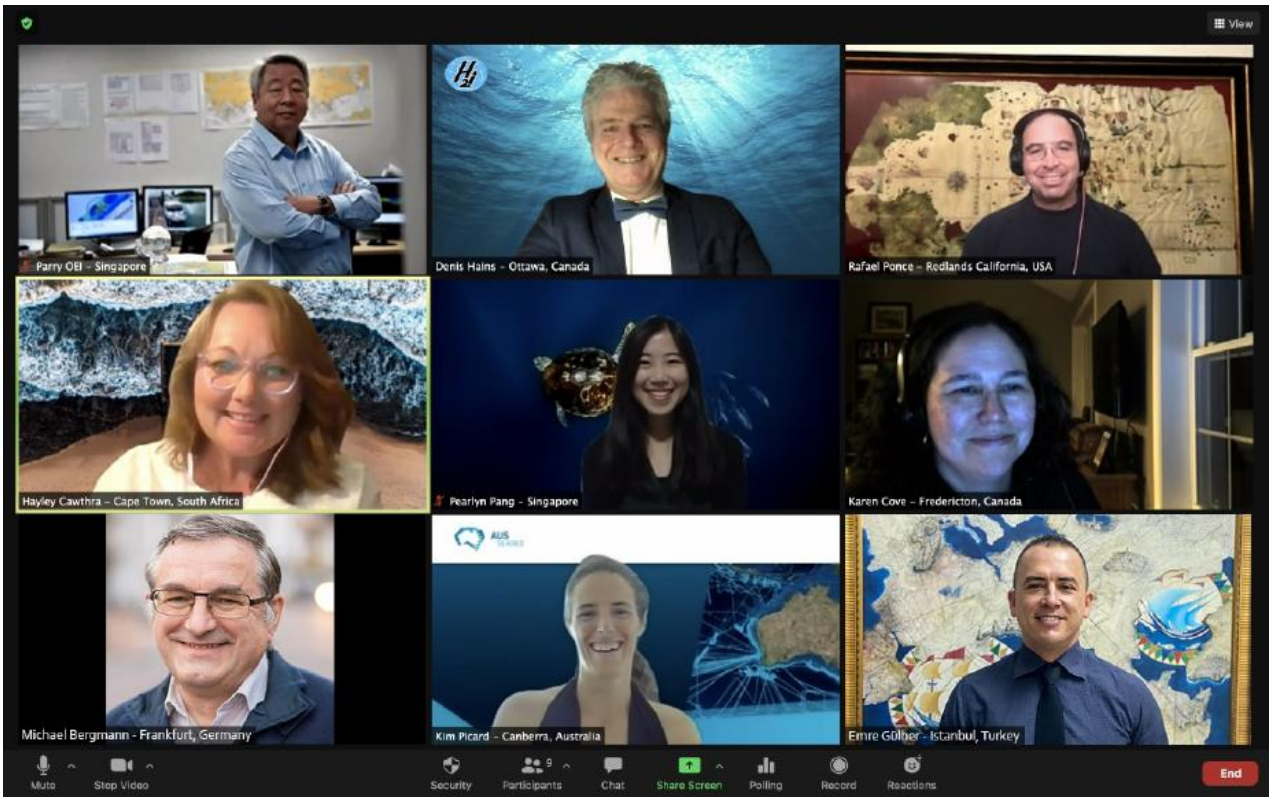

Figure 1. *Authors Group photo from ZOOM Screen Shot*

Introduction

The rapid infusion of technology into our lives which influence the environment that we live in, new terms or acronyms are constantly being spawned e.g. the abbreviations used in SMS on our smartphones. There are now many new words, terminologies and concepts being used in the Geospatial Era and these are not always clearly defined, nor ideally appropriate. The use of a new term, if not well articulated, understood and used, might confuse more than help the larger global dialog.

In an attempt to further expose and embrace the technological advances, and data-centric framework, the lead author suggested the adoption of *hydrospatial* as a new term. As the world moves towards information sharing, exchange and integration, the authors are conscious that there is a need for a word or terminology that better captures the widening interests and presence in the water domain. Under these changing and challenging circumstances that we are confronted with, the current scientific fields of specialization may not be able to address the multi-dimensional dilemma of the present world. Defining the term *hydrospatial* using the existing International Hydrographic Organization (IHO) hydrography definition as a foundation was possibly not the best approach, but a good first step to initiate a broader conversation. But let it be absolutely clear that it is not the objective of this article to replace the definition of hydrography with *hydrospatial* at this time but to commit to improve it. This has to be reframed in a context, where *hydrospatial* is not in opposition to hydrography, but rather an expansion of it (Ponce, 2019 ; Pang & Oei, 2020 ; Ponce, 2020). It is not there to replace the term hydrography; it is an articulation of a more specific scope.

Words, terms and their semantics form the basis of description and expression, and in particular, the way that we convey our ideas and concepts to others. Together with the maritime domain, the

authors are going through a “marine and aquatic spatial” revolution in which the concept of what we do, who we serve, and the benefits of the data and information are changing - and this is so significant that it might require us to adopt a new term to describe it. We need a term that conveys the image of the modern and futuristic, hi-tech, multi-role, dynamic digital data environment in which we now and will operate. The term geospatial has been adopted and is being used widely. Knowing that “Geo” etymologically includes the whole elements “Air, Land and Sea” of our planet, why would we suggest adopting “*hydrospatial*”?

The Need for Hydrospatial…

Generalists may argue that adopting *hydrospatial* is irrelevant as there are many terminologies like ‘geomatics’, ‘geospatial’, ‘spatial data’, which exists. Similarly, there will also be many that will correctly indicate that “Geo” in its root word means ‘earth’ and is all encompassing and includes both land and water domains.

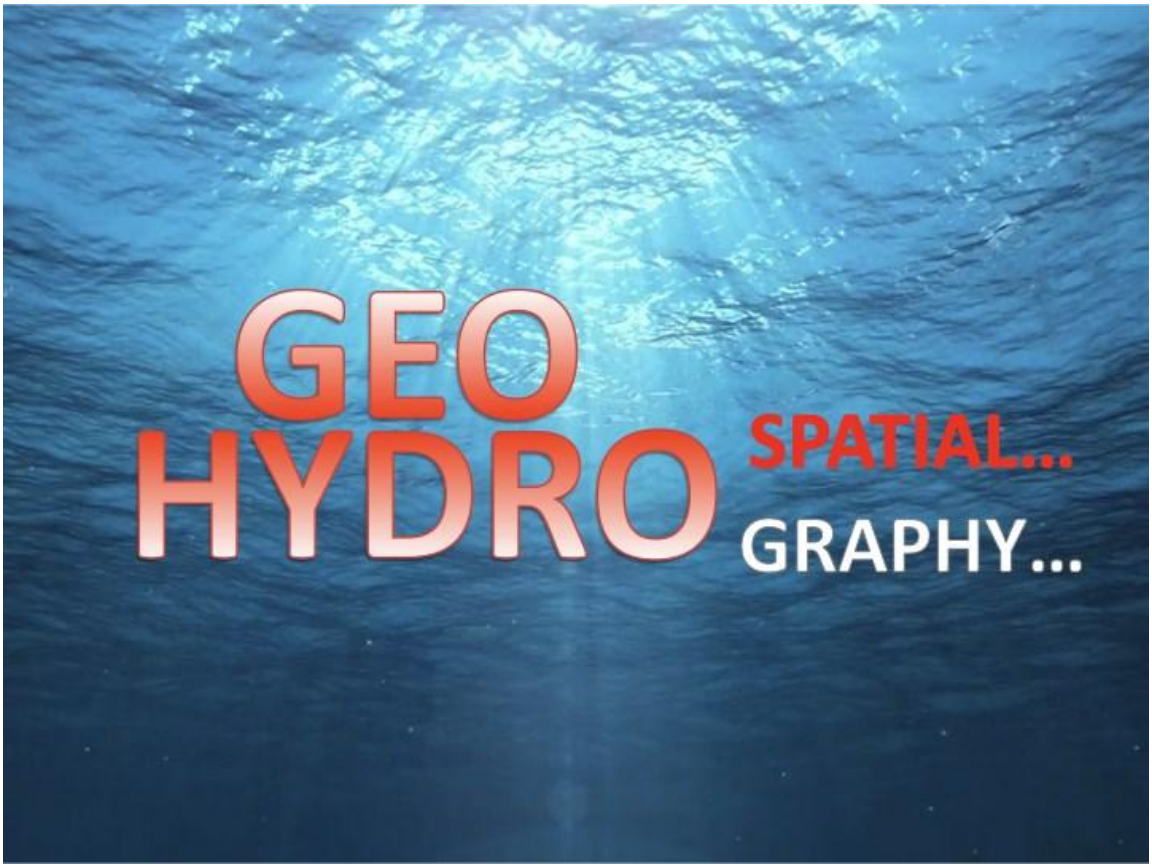

Figure 2. **.** Hains *PowerPoint* Slide about - GEO/HYDRO & SPATIAL/GRAPHY

All these arguments are very legitimate. Geospatial has been adopted and used by the community globally. It better represents the meaning of data and information positioned in X, Y, Z; or latitude, longitude and elevation. Unfortunately, although “Geo” should include both the WET and DRY SIDES; it has in practice been used more to represent first and foremost the DRY SIDE or landmass rather than the WET SIDE or water bodies, when it comes to spatial applications & analysis. This is reasonable as most of the human activities are taking place on the landmass, while the water is often unknown, challenging and taken for granted. That of course does not

mean that water bodies are any less important. Planet Earth is habitable because of the very existence and the effects of water. Life flourished in the water. Therefore, the authors agree on the benefit of a water-specific term in order to emphasize the importance of water bodies, which cover 70% of our planet, and undertake a principal role both in containing climate change and oxygenating our atmosphere.

The question for the “Pro-Geo” promoting the inclusiveness of both land and water, challenging that the landmasses extend underwater which make it Geospatial; would be: why have we not simply used “geography/geoscience” in the first place, instead of defining and adopting the term “hydrography”? The authors suggest that the water or WET SIDE is complex to measure, to understand and to represent on a map or on a chart. And this is probably why, while all the landmasses are pretty well mapped at higher and higher resolution; up until the inception of The Nippon Foundation-GEBCO, Seabed 2030 Project, less than 15% of the seabed was mapped, and we are now approaching to 20%… The value of using *hydrospatial* refers to the water mass specifically, and is considered as important and complimentary to geospatial.

Finally, for those who prefer to use “marine geospatial”, there is nothing wrong with it either. However, *hydrospatial* could be used as a more inclusive terminology for the water domain. The adjective “marine” is often associated with “salt” water and not as much with “fresh” water. Of course, some could use the term “marine and aquatic geospatial” to cover it all. For this reason as well, *hydrospatial* can better represents and describes both salt and fresh water as well as the multi-dimensionality of data, such as: data associated with the sub-bottom, the bottom, within the water column or at the water-atmosphere interface whether these are physical, biological, chemical nature. All this for the purpose of better understanding and managing our planet’s marine and aquatic spatial environment for planning, mapping, charting, navigation efficiency and safety for a rich and sustainable blue economy.

Where to use *hydrospatial*?

The concerns mentioned above are not exhaustive and complete, but the authors wanted to provide some examples. It is our opinion that when the term “spatial” is used to define data in time, space and quality, like in Marine Spatial Data Infrastructure (MSDI), that is the marine component of SDI, the adjective ‘marine’ implicitly limits the scope to the saltwater environment. If the infrastructure and concept is to be expanded to include inland waters, HydroSpatial Data Infrastructure (HSDI) could better represent the scope and magnitude.

While using “marine geospatial” would have the same connotation as with MSDI, the term "*hydrospatial*" would be more inclusive, i.e. include the ocean and inland waters environments. We understand that some will continue to debate that the term geospatial is encompassing them all. However, the authors suggest using the term *hydrospatial* will give more weight and emphasis to the "WET SIDES” area covering over 70% of our planet, so vital to our ways of living and yet so underexplored. This crucial yet complex oceanic and aquatic environment still keeps the secrets of our past and future. Collaboration of all the marine sciences will enable us to exploit that vast potential. Since using geospatial alone is not specific enough to reflect the importance of water and its rationale, we can compensate for the loss by using *hydrospatial* instead.

On January 26, 2021, Mathias Jonas discussed the use of the term "*hydrospatial*" in an article published on the Hydro International website. In it, he made interesting comments and suggested a possible approach to the use of *hydrospatial*. In his article, He also wondered if our inspiration of suggesting the use of *hydrospatial* came from an artist of the mid-twentieth century; it definitely did not come from this artist, but indeed came, at least in part, from the term "Geospatial" that has been used for a while. He explained at length the aspects included in the term *hydrospatial* and

that it should be used in combination with a noun such as information, data and/or infrastructure. His explanation is very close to the meaning the authors want to give to *hydrospatial*. In general, Mathias Jonas also suggests that the term hydrographic does not entirely reflect all the associated disciplines.

This discussion seems to indicate agreement with the spirit of the authors initiative and will contribute to shape the term *hydrospatial* as it becomes more frequently used, in order to better represent the spatio-temporal and multi-dimensional components of ocean and aquatic sciences and activities.

The existing suggested draft definition

In the previous article published as a Note in IHR May 2020, No.23, it was suggested that the definition of "what" *hydrospatial* could incorporate some of the key terms used in the existing IHO definition of hydrography with adjustments as follow:

2020/02/25 - **Hydro~~graphy~~spatial** "*is the branch of applied sciences which deals with the analysis, understanding and access to static and dynamic marine geospatial digital and analog data and information, digital signals, measurement and description of the physical, biological and chemical features of oceans, seas, coastal areas, lakes, estuaries and rivers from all possible available data sources in near-real time, real-time, including history and, ~~as well as with~~ the prediction of their change over time. For the ~~primary~~ purpose of providing timely access to a standard, quality and the most up-to-date marine spatial data infrastructure, including the safety and efficiency of navigation; ~~in support of all other~~ aquatic and marine activities, including for a sustainable Blue environment, economic development, security & defence, scientific research~~, and environmental protection~~.*"

~~*In addition to supporting safe and efficient navigation of ships, hydrography underpins almost every other activity associated with the sea, including:*~~

- ~~*Resource exploration*~~
- ~~*Environmental protection and management*~~
- ~~*National marine spatial data infrastructures*~~
- ~~*Recreational boating*~~
- ~~*Maritime defence and security*~~
- ~~*Tsunami flood and inundation modeling*~~
- ~~*Coastal zone management*~~
- ~~*Toutism*~~
- ~~*Marine science*~~

The main author has been continuing to promote the adoption of the term since, based on this original drafted definition as a starting point. However, all the authors of the current article are suggesting reframing, modifying and simplifying this definition to a more succinct one and representative of the intention; something that currently is being discussed. This will also take into consideration on perspectives of other experts including member of the IHO Hydrographic Dictionary Working Group.

Promotion of *hydrospatial*

Since the presentation at the 2020 Canadian Hydrographic Conference in Quebec City, Canada, additional exposure of *hydrospatial* took place. In addition to the publication of the Note in the IHR May 2020 Edition; some of the authors published further and made virtual presentations on

hydrospatial in 2020. Virtual presentations took place at 6 online events and other articles were published citing *hydrospatial* in the IHR May 2020 and in other professional magazines.

In addition, a virtual and informal "*Hydrospatial* Movement Community (HMC)" was created. This initiative of creating a Community has already started with the engagement of some key individuals willing to join the *Hydrospatial* "Club" to contribute as volunteer advocates to promote the growth of a global *Hydrospatial* Movement Community. The core group or "Club" is currently composed of at least one individual per continent that represents: Africa, Americas; Asia; Australasia; and Europe. The *Hydrospatial* Movement Community core group or "Club" expects to be completed by mid 2021, in order to shift gears, engage and open it to the global community.

Conclusion, next steps and call for interests…

Hydrography as we understand it, in the past, in the moment now and for the future, is essential and will continue to be more relevant than ever; it is not the authors' intent to replace the term hydrography with the term *hydrospatial*. If it happens, it would be a natural evolution of terms in any language according to the needs of the time, but it is not planned for nor expected. The authors think the term expands the science of hydrography from its traditional meaning into a multi-dimensional, multi-use and multiple data content that are becoming more relevant and critical in a digital world of Big Data, the Internet of Things and Artificial Intelligence.

It is felt that moving towards greater use of the term *hydrospatial* does not only highlight the ongoing benefits and the leadership role of hydrography but will at the same time emphasize the new roles for hydrographic data and expertise. This is a prerequisite for high quality and confident data fusion and dissemination in an inspirational way.

The conversation has started, and the authors suggest expanding the circle of interested individuals and organizations to continue this discussion in a constructive manner.

All individuals or organizations interested in furthering the thoughts and the definition of *hydrospatial*, are invited to reach out to one of the authors to express their interest. The *Hydrospatial* Movement Community (HMC) is considering the possibility to hold a virtual meeting series conducted over the next year and reports will be provided when conclusions are reached.

Feedback, comments and suggestions are welcome. If you want to join the "*Hydrospatial* Movement Community" do not hesitate to contact: dhains@h2i.ca

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- SeaTech Week 2020 Virtual Event, Brest France - virtual presentation on **What's *Hydrospatial*?** October 13, 2020: https://www.seatechweek.eu/Detailed-programme-794-0-0-0.html#SHOMHIST
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