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Satellite Data to Monitor International Agreements

1. Introduction

The use of data acquired through earth observation satellites has become commonplace. Whether that data is used for weather predictions, for scientific research with respect to biodiversity or land-use, or for monitoring natural calamities; in the end satellite data has become more prominent and indispensable. The use of satellite data has even expanded as an extremely useful tool to implement international law since it provides factual, relevant and up-to-date information. Further technological developments will steadily increase the range of data which can be collected through Earth Observation and further enhance its accuracy. Therefore, satellite data can be used to monitor compliance with obligations contained within international agreements or to resolve disputes before an international court. This brief will consider the current use of satellite data in assisting the implementation of international law and discuss the possible future use in further implementing international law, with respect to current and future international agreements and to serve as evidence before international courts.

2. Current Use of Satellite Data in International Law

Satellite data is currently used both in monitoring international agreements and as evidence before the International Court of Justice (ICJ). For instance, the Globwetland projects, funded by ESA, support the Ramsar Convention on the conservation of wetlands and waterfowl through the use of satellite data. Globwetland I and Globwetland II demonstrated the potential of satellite data to monitor wetlands. The latest project, Globwetland Africa, aims to assist African States to fulfil their obligations and commitments towards the Ramsar Convention by providing maps which, *inter alia,* identify and delineate wetland areas, water cycle regime monitoring, and map waterfowl habitats. Another example is the ESA-UNESCO Open Initiative project and the participation therein of DLR. Within the project, satellite data is used to support the World Heritage Convention, for example, by tracking changes in Mexico City with respect to terrain subsidence due to groundwater extraction or by assisting the governance of Machu Picchu through the mapping of activities and land use. Additionally, satellite data can be used to aid disaster management as is the case with UN-SPIDER which was established under U.N. General Assembly resolution 61/110. The goal of the programme is to provide space-based information and services, such as maps of the affected areas.

Further use of satellite data can be seen in the proceedings of the ICJ to aid the implementation of agreed rules of international law. In the *Territorial and Maritime Dispute between Nicaragua and Honduras* case, satellite imagery was used by Honduras to show that islands in the river mouth of the Rio Coco are formed due to sediment, which assisted in establishing the equidistance line to set the territorial sea of the two countries. In the *Maritime Delimitation and Territorial Questions between Qatar and Bahrain* case both parties used satellite data in the proceedings to present support for their claims on disputed islands. Satellite data was used to get more accurate information on the sea-level and thereby establish whether the 'islands' should and could be

considered as actual islands or sand banks. Finally, satellite data was used in the *Certain Activities Carried Out by Nicaragua in the Border Area* case by Nicaragua to prove the existence of the 'caño', or channel, by using satellite imagery from 1961 in which the caño was visible. Costa Rica contested the clarity of the satellite imagery because of thick vegetation, while producing its own satellite image from 2010 which would rule out the existence of a channel. Importantly, the ICJ concluded that the lack of clarity in the satellite imagery means that the satellite imagery could not be used as evidence to prove the existence of the caño. However, satellite imagery was further used as supporting evidence for the existence of river deltas prior to the construction of a road, while Nicaragua stated that these only came into existence after a road was created and caused significant harm to Nicaragua. The aforementioned examples show the usefulness of satellite data, if it can be determined that the data is reliable and accurate.

3. Further Use of Satellite Data in International Law

The current use of satellite data, however, has not been laid down in the international agreements. Rather, it is dependent on initiatives by stakeholders or, in the matter of the ICJ cases, used as evidence. Nevertheless, the obvious benefit provided by satellite data calls for specific provisions detailing the use of space-based data to monitor international agreements. Although it has not yet entered into force, the Comprehensive Nuclear-Test-Ban Treaty (CTBT) explicitly states in Article IV paragraph 11 that satellite monitoring should be considered and examined as a means for verification. Such provisions could also be included in current or new international agreements which would benefit from the use of satellite data to verify whether the State Parties comply with the obligations contained therein. Examples would be the monitoring of the emissions with respect to the U.N. Framework – Convention on Climate Change (UNFCCC) Paris Agreement or the monitoring of compliance with provisions under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). However, such provisions will be politically contentious as States would be reluctant to accept international organisations or other States monitoring their compliance and would question the integrity of satellite data of other States. There is thus a question of confidence in the data, reliability of the processing of the data, and neutrality of the interpretation of the data. This further leads to a twofold problem. Namely, how to determine the reliability, i.e. how can you verify the integrity of the data, and who will determine what can be considered to be reliable data, i.e. who has the authority on verifying the integrity of the data. A first step to resolve these issues would be to propose a process for the certification of space data in order to allow to further develop and encourage the use of satellite data in the monitoring of international agreements. Initiatives such as Treaty Enforcement Services using Earth Observation and projects such as Globwetland already assist in the development. Such initiatives can serve as the basis from where the use of satellite data can be further extended, processes to verify the data developed, and standards to which satellite data has to adhere to be used to monitor international agreements set out.

Nonetheless, satellites can also be used in a less politically charged capacity; by assisting States in adhering to their obligations and commitments. For example, data provided by earth observation could be used as the foundation in gaining more insight and taking more appropriate measures to adhere to international obligations. That data can be used to adhere to the nationally determined contribution under the UNFCCC Paris Agreement, to monitor greenhouse gases emissions over particular regions, to protect wetlands and waterfowl, or to combat deforestation. However, before this data can be used the necessary technology will have to be developed and validated, as of now the technology for the aforementioned examples are in different stages of development.

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