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## AN OPEN SKY: OPEN ACCESS SATELLITE DATA MAY HELP US MAKE BETTER DECISIONS

*Arielle Devorah*\*

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### **I. Introduction**

The effects of climate change are much worse than ever before.<sup>1</sup> They are so dire that the world could be experiencing a climate catastrophe by 2040.<sup>2</sup> According to the International Panel on Climate Change (IPCC), “[l]imiting global warming to 1.5 °C above pre-industrial levels would be a herculean task, involving rapid, dramatic changes in how governments, industries and societies

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\* Junior, BA Law, University of Arizona. I am still exploring areas within the law, but I have always been intrigued by space, international law, big data, and intellectual property, so this note is a reflection of where these interests intersect. First and foremost, I owe a big thank you to the Arizona BA Law program faculty and staff, for constantly innovating and finding ways to enrich my undergraduate experience. I would like to thank all of the Senior AJELP Editors who worked hard to integrate me into the Journal, and for their patience while giving me their honest, constructive feedback about my work. Also, I would like to thank Dr. Andrew Woods, who helped me think through my first comment and for offering his feedback on preliminary drafts. Lastly, I would be nowhere without my incredibly supportive family and friends. While this year has definitely been a learning curve, I have truly enjoyed every moment. I am so grateful for the opportunity to continue my involvement with AJELP next year.

<sup>1</sup> Jeff Tollefson, *IPCC Says Limiting Global Warming To 1.5 °C Will Require Drastic Action*, *Nature: International Journal of Science* (Oct 8, 2018), <https://www.nature.com/articles/d41586-018-06876-2> (last accessed Nov. 11, 2018).

<sup>2</sup> *Id.*

function.”<sup>3</sup> To meet this 1.5 °C target, carbon emissions must be cut by at least 32.5 gigatons, or 49% of 2017 levels, by 2030.<sup>4</sup>

Satellites play a pivotal role in meeting the 1.5 °C target. Environmental Satellites help us understand climate change by monitoring global temperatures, weather patterns, floods, geographical shifts of ecosystems, and more.<sup>5</sup> Extracting the data and transferring it to researchers and policymakers makes using environmental satellites difficult. Statistics estimate that over half of earth-observing satellites’ data is inaccessible.<sup>6</sup> This can be traced to costs and security concerns. Yet, these restrictions on data limit the progress of science. In America, where climate-change research funding is under threat, it is more important than ever that researchers have free access to environmental data.

This comment will first briefly cover the functions of environmental satellites. Then, it will outline current data sharing policies within the context of international law. Third, it will cover regional policies and finally, will take a glimpse into how to tackle the challenge of access moving forward.

## II. Understanding the Functions of Environmental Satellites

Satellites contribute a wealth of useful environmental information. Compared to other observation systems, satellites are better suited to the task due to their ability to observe remote areas, like the Arctic.<sup>7</sup> Satellites measure the incoming energy from our sun and outgoing thermal energy from the Earth, a “foundational climate measurement.”<sup>8</sup> Since the start of the space age, 35 nations have been active in the satellite scene, and more than 450 Earth observation satellites have been launched.<sup>9</sup> One hundred seventy-three of those satellites were government-owned.<sup>10</sup>

## III. International Law Instruments for Monitoring the Earth

International law is not binding; rather, it operates on a mostly voluntary basis. A country may elect to be obligated, or not, by certain international laws. Instruments have more binding effect if countries agree to honor them through ratification.<sup>11</sup> Countries who do not ratify may become symbolic outcasts.

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<sup>3</sup> *Id.*

<sup>4</sup> *Id.*

<sup>5</sup> Woody Turner, et al., *Free and Open-Access Satellite Data Are Key to Biodiversity Conservation*, 182 *BIOLOGICAL CONSERVATION JOURNAL* 174 (Feb. 2015).

<sup>6</sup> Mariel Borowitz, *Half of Earth’s satellites restrict use of climate data*, *THE CONVERSATION*, (Apr. 3, 2018), <https://theconversation.com/half-of-earths-satellites-restrict-use-of-climate-data-93257> (last accessed Oct. 01, 2018).

<sup>7</sup> *Id.*

<sup>8</sup> Mariel Borowitz, *Open Space: The Global Effort for Open Access to Environmental Satellite Data*, 4, (MIT Press, 1<sup>st</sup> edition 2017).

<sup>9</sup> *Id.*

<sup>10</sup> *Id.*

<sup>11</sup> UN Doc. A/Conf.39/27; 1155 UNTS 331; 8 *ILM* 679 (1969); 63 *AJIL* 875 (1969).

There are three main international law instruments that have the most influence over monitoring Earth. The first is the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space. This document states that the exploration and use of outer space is to be for the benefit and interests of all countries and shall be “the province of all mankind.”<sup>12</sup> Currently, there are 107 parties to this agreement, including the United States, who ratified it in 1967.

The United Nations General Assembly Resolution containing the Principles Relating to Remote Sensing of the Earth from Outer Space of 1986 (Resolution 41/65) is also of note.<sup>13</sup> Resolution 41/65 discusses the idea of sovereignty of the “sensed” (observed) states.<sup>14</sup> The key principle here is that as soon as the primary data and the processed data concerning the territory under its jurisdiction are produced, the sensed state shall have access to them on a non-discriminatory basis and on reasonable cost terms.<sup>15</sup> The idea of the sensed state and its observer refer to the division underlying much of Resolution 41/65. A clash occurs between the developed states doing the sensing, and the developing states who are being observed. The developing states are afraid that other states' remote sensing operations might encroach upon their sovereignty, particularly encroaching upon the developing state's sovereignty over its natural resources.<sup>16</sup> The delicate question of sovereignty encroachment and security poses a legal obstacle to making satellite data readily available.

The third key instrument that governs environmental satellites is The New Delhi Declaration. This agreement translated the intent of the world's space agencies to support the Paris Agreement reached at the COP21 conference. The New Delhi Agreement achieved consensus across the global space community: More than 60 nations, including the United States, have decided to work together to establish an international, independent system for estimating and reducing global greenhouse gas emissions based on accepted data.<sup>17</sup> The New Delhi Declaration outlines an agreement to create “evolving space-based operational

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<sup>12</sup> Timiebi Aganaba-Jeanty, *Satellites, Remote Sensing, and Big Data: Legal Implications for Measuring Emissions*, Centre for International Governance Innovation, 10, CIGI Paper No. 151 (Nov. 2, 2017).

<sup>13</sup> Principles Relating to Remote Sensing of the Earth from Space, U. N. G.A. RES. DOC. A/Res/41/65, 95th plenary meeting, Dec. 3, 1986, <http://www.un.org/documents/ga/res/41/a41r065.htm>.

<sup>14</sup> *Id.*

<sup>15</sup> Charles Davies, Susan Hoban, & Braden Penhoet, *Moving Pictures: How Satellites, the Internet, and International Environmental Law Can Help Promote Sustainable Development*, 28 STETSON L. REV. 1091, 1109 (1999).

<sup>16</sup> Frans G. von der Dunk, *European Satellite Earth Observation: Law, Regulations, Policies, Projects, and Programmes*, 42 CREIGHTON L. REV. 397 (2009).

<sup>17</sup> OFF. FOR SCI. & TECH. OF THE EMBASSY OF FR. IN THE U. S., *New Delhi Declaration Comes into Effect - World's Space Agencies Working to Tackle Climate Change*, (May 19, 2016), <https://www.france-science.org/New-Delhi-Declaration-comes-into.html>.

tools combining in-situ measurements and increased computing resources.”<sup>18</sup> To this end, space agencies will need to develop new technologies and encourage their research community to contribute actively.<sup>19</sup>

These international measures that create customary law for the sake of encouraging cooperation are important and positive steps toward more accessible data. Treaties and agreements on the use of satellites ensure that states are cognizant of the benefits that they can glean from unrestricted data.

The fight to make environmental data more accessible is important for global leaders to make informed decisions about our future. One program working to this end is the Group on Earth Observations (GEO). One of the accomplishments of GEO was the acceptance of a set of high-level data sharing principles as a foundation for Global Earth Observation System of Systems (GEOSS).<sup>20</sup> Ensuring that these principles are implemented in an effective but flexible manner remains a major challenge. The 10-Year Implementation Plan states, "the societal benefits of Earth observations cannot be achieved without data sharing" and sets out the GEOSS data sharing principles.<sup>21</sup>

#### **IV. Comparative Brief Overview of National Environmental Satellite Programs and Data Sharing Policies**

##### **A. United States**

The United States is a global leader in sharing its satellite data. NASA made its data accessible to users in 1992. The National Oceanic and Atmospheric Association (NOAA) has been increasing the amount of data provided free-of-charge since the 1990s, and the United States Geological Service (USGS) opened the Landsat archive for free and unrestricted access in 2008. NASA has negotiated over 800 agreements with developing countries for distribution of remote sensing data. NASA's overarching policy is to acknowledge global environmental concerns, and when aligned with the foreign policy of the United States and its duties, contribute support to programs designed to increase international cooperation in anticipating and preventing a decline in the quality of the world environment.<sup>22</sup>

##### **B. Europe**

The European Space Agency (ESA) and the European Meteorological Satellite Organization (EUMETSAT) are organizations that often collaborate to create policy and law.<sup>23</sup> However, it is important to point out that there is no

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<sup>18</sup> *Id.*

<sup>19</sup> *Id.*

<sup>20</sup> GROUP ON EARTH OBSERVATIONS, *GEO at A Glance*, [https://www.earthobservations.org/geo\\_wwd.php](https://www.earthobservations.org/geo_wwd.php).

<sup>21</sup> *Id.*

<sup>22</sup> Davies, *supra* note 15.

<sup>23</sup> *Id.*

single European nation that controls these instruments. Major parts of policymaking are still very much up to each member state. France and its national programs involvement in the ESA and EUMETSAT offer member states an opportunity where their policies can be taken to higher levels.<sup>24</sup>

The European agencies have been forerunners in adopting the aforementioned international customary regulatory instruments. An important document that the European organizations abide by is Resolution 40, adopted by the World Meteorological Organization (WMO). All organizations bound by this resolution must share “on a free and unrestricted basis essential data and products which are necessary for the provision of services in support of the protection of life and property and the well-being of all nations.”<sup>25</sup> The most prominent program in Europe is the Copernicus partnership, between the ESA and EUMETSAT. This program was created to provide data needed by European policy-makers to address environmental policy issues and is Europe’s contribution to the GEOSS program. Its goals are to “provide accurate, timely and easily accessible information to improve the management of the environment, understand and mitigate the effects of climate change and ensure civil security.”<sup>26</sup>

### C. Asia: India & China

Asia’s satellites are perhaps the most impenetrable today. India’s satellite program has developed many meteorological and remote sensing satellites over the last decade. However, unlike other prominent meteorological agencies, they limit access to their data.<sup>27</sup> While it is understandable that there is a large wealth and resource disparity between India and other countries, India puts satellites in orbit with the main purpose being self-service. This can also be attributed to India’s more mercantilist-valued approach to selling its commercial data, rather than contributing important meteorological data. The world’s scientists are lacking a significant amount of knowledge due to India’s restrictions on its vast amount of data. Likewise, China’s environmental satellite program is robust, but the access to the data collected is measured and tiered. Most of China’s dataset has restrictions placed on it, which makes it difficult for researchers to access. Governmental bodies have access to the data, but the further removed one gets from those bodies, the more opaque the data becomes.<sup>28</sup>

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<sup>24</sup> von der Dunk, *supra* note 14.

<sup>25</sup> *Id.*

<sup>26</sup> EUR. SPACE AGENCY, *Copernicus Observing the Earth*, [https://www.esa.int/Our\\_Activities/Observing\\_the\\_Earth/Copernicus/Overview3](https://www.esa.int/Our_Activities/Observing_the_Earth/Copernicus/Overview3).

<sup>27</sup> Borowitz, *supra* note 8, at 164.

<sup>28</sup> *Id.*

## V. Conclusion: Challenges and Hopes for the Future

Although significant steps have been taken in recent years to offset the amount of uncovered or unshared data, world change-makers still grapple with the fact that they don't have access to half of the available information produced.<sup>29</sup> Thus, there remains a lack of participation amongst countries in global initiatives, and the contributors are always the same few countries. Not only does participation need to be expanded upon, the extent to which countries already participating must also be deepened.

There are a variety of ways this can happen. First, more member states should join the GEO, and contribute to GEOSS. This program creates an appropriate amount of peer pressure, which is an important component of international cooperation. Most databases around the world should also model their data sharing off of Landsat. A good first step would be for the ESA to increase access to Sentinel images.<sup>30</sup> Further, governments must continue to encourage their space agencies to communicate with one another so that more unified programs can be created. The more environmentally focused the governments are, the less they worry about issues like sharing sensitive intelligence and sovereignty. The world can also continue to draft and implement international law and use instruments—like memorandums of understanding—to further common interests. There is hope to be had if countries can reconcile their differences in terms of both cost and sovereignty claims. If this occurs, our environment can be rescued through a collaboration between scientists and policymakers.

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<sup>29</sup> Mariel Borowitz, *supra* note 6.

<sup>30</sup> Michael A. Wulder & Nicholas C. Coops, *Satellites: Make Earth Observations Open Access*, NATURE (Sept. 2, 2014), [www.nature.com/polopoly\\_fs/1.15804!/menu/main/topColumns/topLeftColumn/pdf/513030a.pdf](http://www.nature.com/polopoly_fs/1.15804!/menu/main/topColumns/topLeftColumn/pdf/513030a.pdf).