

**Karl SZEKIELDA**

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**Research Professor/Adjunct**

**Courses:**

Spring 2013 Oceanography, International Pollution Issues  
Hunter College

**1982- to present** Department of Geography  
Hunter College, City University of New York

**1999- to present** Member Doctoral Faculty  
Ph.D. Program in Earth and Environmental Sciences  
City University of New York  
The Graduate School and University Center

Columbia University Research Associate:

[http://www.seas.columbia.edu/earth/research\\_associates/szekiolda.pdf](http://www.seas.columbia.edu/earth/research_associates/szekiolda.pdf)

**2012 to present** Member Editorial Advisory Board of *The Open Oceanography Journal*

Summer

**2012** Fulbright Specialist  
Fulbright Specialist Program  
Ateneo de Manila University, Manila, Philippines  
Department of Environmental Science

Summer

**2008, 2009, 2010** Senior Faculty Fellow  
**2006 and 2007** Faculty Fellow  
ONR/ASEE Summer Faculty Research Program  
Naval Research Laboratory  
Washington, D.C.

**2000-2003** NOAA Research Professor  
Cooperative Remote Sensing Science  
and Technology Center, CUNY

**2000-2003** Adjunct Professor  
Department of Electrical Engineering  
City College, City University of New York

**2001** Adjunct Professor  
Natural Science Division, Marine Science  
Long Island University  
Southampton College

**1999-2001** Adjunct Professor  
School of Continuing and Professional Studies  
New York University

<b>1998</b>	Adjunct Professor Department of Physics Long Island University, Brooklyn Campus
<b>1988</b>	Visiting Professor Academia Sinica, Beijing, China
<b>1976-1978</b>	Visiting Full Professor University of Hamburg and Visiting Scientist Foundation in Maritime Transportation and Shipbuilding (GKSS) Geesthacht, Germany
<b>1971-1975</b>	Assistant Professor College of Marine Studies University of Delaware
<b>1969-1971</b>	National Academy of Sciences Associate NASA Goddard Space Flight Center Greenbelt, Maryland
<b>1966-1969</b>	Researcher, Centre National de la Recherche Scientifique (CNRS) Station Marine d'Endoume et Centre d'Océanographie Marseille, France
<b>1974-76, 1978-1996</b> <b>June 1996-</b> <b>Dec. 1996</b>	<b>United Nations</b> Chief of Branch Environment and Natural Resources Management Division Economic and Social Commission for Asia and the Pacific <i>United Nations, New York</i>
<b>1992-1996</b>	Chief of Section, Department of Development Support and Management Services
<b>1989-1992</b>	Chief, Cartography Unit
<b>1978-1989</b>	Chief, Remote Sensing Unit
<b>1974-1976</b>	Ocean Economics and Technology Office

#### **Awards**

Fulbright Specialist, Fulbright Specialist Program, Ateneo De Manila University, Philippines, June-July 2012.

Office of Naval Research/American Society for Engineering Education (ONR/ASEE) Senior Faculty Fellow at the Naval Research Laboratory, Washington, D.C., for three consecutive summers, 2008-2010, and Faculty Fellow, summers 2006-2007.

2004 Anastasia Van Burkalow Distinguished Service Award.

1976 Océ-van der Grinten Prize for Monitoring marine pollution from space.

National Academy of Sciences/National Research Fellow at National Aeronautics and Space Administration (NASA) Goddard Space Flight Center, 1969-1971.

## Recent publications

Hyperspectral Observations of Internal Waves. Karl Szekiolda. *International Journal of Geology, Earth and Environmental Sciences*, January-April 2012, 79-82, ISSN: 2277-2081, <http://www.cibtech.org/jgee.htm> .

High Spatial Resolution Spectrometry of rafting macroalgae (Sargassum). Karl Szekiolda, George O. Marmorino, Jeffrey H. Bowles, David Gillis. *Journal of Applied Remote Sensing*, SPIE Digital Library, Vol. 4, 043529, 2010, 13 pp, <http://dx.doi.org/10.1117/1.34310444>

Patch Recognition of Algal Blooms and Macroalgae. K. H. Szekiolda, J. H. Bowles, D. B. Gillis, W. Snyder and W. D. Miller, *SPIE Proceedings*, Vol. 7678, Ocean Sensing and Monitoring II, Weilin (Will) Hou; Robert A. Arnone, Editors, 20 April 2010, <http://dx.doi.org/10.1117/12.854772> .

Hyperspectral Imager for the Coastal Ocean (HICO): Long Island Sound. Karl Szekiolda, Michal Corson, Jeffrey Bowles and Ellen Bennert, *Long Island Sound Research Conference Proceedings, 2010*, Stamford CT, October 29-30, 2010. [http://lisfoundation.org/downloads/lisrc\\_proceedings2010.pdf](http://lisfoundation.org/downloads/lisrc_proceedings2010.pdf)

Interpretation of Absorption Bands in Airborne Hyperspectral Radiance Data. Karl Szekiolda, Jeffrey H. Bowles, David B. Gilles and W. David Miller, *Sensors*, 9 (4), 2009, pp. 2907-2925, <http://www.mdpi.com/1424-8220/9/4/2907/pdf>

Brown Tide Final Report, Principal Investigator for CUNY Research Foundation Project No. 70694 with Suffolk County Department of Health, 2009, <http://www.peconicestuary.org/BrownTideA.pdf>

Bloom observations with satellites in the Peconic Bay. *Long Island Sound Foundation, Research Conference Proceedings 2008*, University of Connecticut, New London, CT, 2008, 35-36 .

Airborne hyperspectral imaging of cyanobacteria accumulations in the Potomac River, Karl Szekiolda, George Marmorino, Shelia J. Maness, Timothy Donato, Jeffrey H. Bowles, W. David Miller, W. Joseph Rhea. *Journal of Applied Remote Sensing*, vol. 1, 2007, 1-14, <http://dx.doi.org/10.1117/1.2813574>

Use of the first and second chlorophyll absorption bands for marine biogeochemical patch recognition. *Indian Journal of Marine Sciences*, Special Issue: Ocean Color, vol. 34 (4), December 2005, pp. 387-395, [http://modis.gsfc.nasa.gov/sci\\_team/pubs/abstract.php?id=02785](http://modis.gsfc.nasa.gov/sci_team/pubs/abstract.php?id=02785) .

Pattern recognition of marine provinces. *International Journal of Remote Sensing*, Vol. 26, No. 7, London, 2005, pp. 1499-1503.

## Recent Conferences/Presentations

Algal bloom detection (in the New York Bight) by remote sensing  
New York Marine Sciences Consortium Fifth Annual Research Symposium  
The New York Bight: Past, Present and Planning for the Future  
In cooperation with the New York State Department of Environmental Conservation  
Wang Conference Center of Stony Brook University, Stony Brook, New York, September 22, 2012.

Observations of Algal Blooms from the International Space Station in the Coastal Ocean  
Geology, Earth Science and Oceanography Series (GEOS)  
City University of New York Graduate Center, March 1, 2012

Eutrophication and Suspended Matter in the Yangtze River Effluent and Hangzhou Bay Observed with the Hyperspectral Imager for the Coastal Ocean (HICO)  
2012 Ocean Sciences Meeting  
Salt Lake City, February 20-24, 2012

Algal bloom detection by remote sensing  
Karl Szekiolda  
Topics in Atmospheric and Oceanic Sciences (TAOS)  
SUNY School of Marine and Atmospheric Sciences  
Stony Brook, NY, February 16, 2011

First observations over Long Island Sound with Hyperspectral Imager for the Ocean (HICO)  
Karl Szekiolda, Michael Corson, Jeffrey Bowles, Ellen Bennert  
Long Island Sound Research Conference  
Stamford, CT, 29-30 October 2010

Patch recognition of algal blooms  
Karl H. Szekiolda, Jeffrey H. Bowles, David Gillis, W. Snyder, D. Miller.  
(presented by D. Gillis)  
*SPIE Defense, Security and Sensing*  
Orlando World Center Marriott Resort & Convention Center  
Orlando Florida, 5-9 April, 2010  
Spatial and temporal scales of bloom observations with satellites

NASA Ocean Color History Workshop  
St. Petersburg, FL, January 12-14, 2009

#### **Book**

*Satellite Monitoring of the Earth*, John Wiley and Sons, Inc. New York, 1988, 326 pp.

#### **Courses taught**

##### **City University of New York, Hunter College**

Oceanography (Spring 2013, Spring and Fall, 2012, Spring and Fall 2011, Spring and Fall 2010, Spring and Fall 2009, Spring and Fall 2008, Fall 2004, Spring 2003, Spring 2002, Fall 1999)  
Remote Sensing (Spring 2010, Spring 2006, Fall 2002, Spring 2002)  
International Pollution Issues (Spring, 2013, Spring and Fall 2012, Fall 2010, Fall 2009, Spring 2008, 2007, 2006, 2005, 2004, 2003)  
Environmental Hazards (Fall 2012, Fall, 2011, Fall 2010)  
Sustainable Development and Environment through International Cooperation (Fall 2007, 2003, 2002)  
Coastal Zone Management (Fall 2006, 2005)  
Development and International Cooperation (Fall 2004)  
Oceans and Earth Environment (Fall 2003, Spring 1999, Spring 1998)  
Coastal Geomorphology (Fall 2001, 1999, 1998)  
Satellite Monitoring of Earth (Spring 2001, Fall 1998)  
Urban and Metropolitan Coasts (Spring 1998)

##### **City University of New York, City College**

Remote Sensing and Satellite Imaging (Spring 2003, Fall 2002, Spring 2002, Fall 2001, Spring 2001, Spring 2000)

##### **New York University, SCPS**

Environmental Studies (Spring 2000, Fall 1999)  
International Organizations (Summer 2000)

##### **Long Island University, Southampton College**

Physical Oceanography (Fall 2001)

##### **Long Island University, Brooklyn Campus**

Earth Sciences (Spring 1998)

#### **Contributions to books**

Spatial Variability of River Plumes and Eutrophication, with D. McGinnis, co-author. In: *Biogeochemistry of Major World Rivers*, ed. by E.T. Degens et al., John Wiley and Sons, Inc., Chichester, 1991, pp. 1-24.

New Concepts in Patch Recognition of Suspended Matter in Coastal Areas, with D. McGinnis and R. Carey, co-authors. In:

*Facets of Modern Biogeochemistry*, ed. by V. Ittekkot, et al., Springer Verlag, Berlin 1990, pp. 155-174.

Satellite Observations Over the North Sea, with D. McGinnis, P. Mc Clain and D. Clark, co-authors. In: *Biochemistry and Distribution of Suspended Matter in the North Sea and Implications to Fisheries Biology*, ed. by S. Kempe et al., Geological-Paleontological Institute, University of Hamburg, 1988, pp. 1-33.

Investigations with Satellites on Eutrophication of Coastal Regions, Response of the Somali Upwelling onto Monsoonal Changes. In: *Transport of Carbon and Minerals in Major World Rivers*, ed. by E.T. Degens et al., University of Hamburg, 1987, pp. 93-112.

The Changjian Regime, with D. McGinnis and E.T. Degens, co-authors. In: *Transport of Carbon and Minerals in Major World Rivers*, ed. by E.T. Degens et al., University of Hamburg, 1987, pp. 171-174.

Potential Use of Satellites for Assessing Pools and Fluxes of the Carbon Cycle. In: *The Global Carbon Cycle*, ed. by B. Bolin et al., John Wiley and Sons Inc., Chichester, 1979, pp. 379-402.

Eolian Dust Into the Northeast Atlantic. In: *Oceanography and Marine Biology: an Annual Review*, ed. by M. Barnes, Aberdeen, Aberdeen University Press, 16, 1978, pp. 11-41.

Spacecraft Oceanography. In: *Oceanography and Marine Biology: an Annual Review*, ed. by M. Barnes, Aberdeen, Aberdeen University Press, 14, 1976, pp. 99-166.

#### **Edited**

*Satellite Remote Sensing for Resources Development*, Graham and Trotman, Ltd., London, 1986, 221 pp., with contribution on General Aspects of the use of Satellite Remote Sensing for Resources Exploration in Developing Countries, 1-21.

*Interregional Seminar on Development and Management of Resources of Coastal Areas*, with B. Breuer, co-editor, UN and the German Foundation for International Development, Berlin (West), 1976, 546 pp., with contribution on Coastal Mapping from Satellite Altitudes, 457-468.

#### **Publications in scientific journals**

Spectral Reflectance measurements of estuarine waters, with C. Gobler, F. Moshary, B. Gross and S. Ahmed, co-authors. *Ocean Dynamics*, 53, 2003, pp. 98-102.

Investigations with Satellites on Eutrophication of Coastal Regions, Part III: the Patch Concept. In: *Transport of Carbon and Minerals in Major World Rivers, Part III*, ed. by E.T. Degens et al., *SCOPE/UNEP* Special Issue, 58, University of Hamburg, 1985, pp. 33-49.

Investigations with Satellites on Eutrophication of Coastal Regions, Part IV: the Changjiang River and the Huanghai Sea, D. McGinnis, co-author. In: *Transport of Carbon and Minerals in Major World Rivers, Part III*, ed. by E.T. Degens et al., *SCOPE/UNEP* Special Issue, 58, University of Hamburg, 1985, pp. 49-85.

Eutrophication of Coastal Regions, Part V: Note on the Amazon Saltwedge. In: *Transport of Carbon and Minerals in Major World Rivers, Part III*, ed. by E.T. Degens et al., *SCOPE/UNEP* Special Issue, 58, University of Hamburg, 1985, pp. 85-91.

Large-scale Mapping of Vegetation. In: *Transport of Carbon and Minerals in Major World Rivers, Part III*, ed. by E.T. Degens et al., *SCOPE/UNEP* Special Issue, 58, University of Hamburg, 1985, pp. 91-101.

Investigations with Satellites on Eutrophication of Coastal Regions, Part II, D. McGinnis and R. Gird, co-authors. In *Transport of carbon and Minerals in Major World Rivers, Part II*, ed. by E.T. Degens et al., *SCOPE/UNEP* Special Issue, 55, University of Hamburg, 1983, pp. 55-84.

- Turbidity Zones Over the Rio de la Plata Region as Monitored with Satellites, L. Piatti and R. Legeckis, co-authors. In: *Transport of Carbon and Minerals in Major World Rivers, Part II*, ed. by E.T. Degens et al., *SCOPE/UNEP* Special Issue, 55, University of Hamburg, 1983, pp. 183-192.
- Investigations with Satellites on Eutrophication of Coastal Regions., In: *Transport of Carbon and Minerals in Major World Rivers, Part I*, ed. by E.T. Degens, *SCOPE/UNEP* Special Issue, 52, University of Hamburg, 1982, pp. 13-37.
- Scales of Oceanic Parameters as Monitored From Space, *Remote Sensing Quarterly*, 2, 1980, pp. 16-35.
- Satellite Investigations on the Dynamics of the Subtropical and Antarctic Convergence Zones, *Deutsche Hydrographische Zeitschrift*, 36, 1983, pp. 25-43.
- Investigations of Marine Resources in the Octava Region of Chile, *D + C*, Berlin, 2, 1979, pp. 27-28.
- El Estudio del Ambiente Costero Mediante Sensores Remotos (trans. from English), University of Concepcion publication, 1979, pp. 412-440.
- Interpretation of Satellite Data for the Near Coastal Region, *Kest Berichte*, 30, 1978, pp. 50-70.
- Remote Sensing of Marine Renewable Resources. In: *Aerial/Spatial Remote Sensing and Marine Resources*, Brest, 1977, pp. 237-251.
- Skylab Investigation of the Upwelling off the Northwest Coast of Africa, D. Suszkowski and P. Tabor, co-authors, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 37, 1977, pp. 205-213.
- Fast Temperate Changes in the Upwelling Area Along the NW Coast of Africa, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 36, 1976, pp. 199-204.
- Pattern Recognition of Suspended Material, J.T. Duvall, co-author, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 36, 1976, pp. 205-216.
- Chlorophyll Determination of Phytoplankton: a Comparison of *in vivo* Fluorescence with Spectrophotometric Absorption, M. Marker, co-author, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 36, 1976, pp. 217-219.
- Use of Satellite Data in Coastal Zone Programmes, *Ocean Management*, 3, 1976 pp. 31-56.
- Monitoring African Dust Events: Comparison of Satellite Imagery, Field Data and Laboratory Analysis, C. Brine, co-author, *Trans., Am. Geophys. Union*, 56, 1975, p. 6.
- The Release of Manganese in Sea Water by Eolian Dust from Africa, C. Brine, co-author, *Deutsche Hydrographische Zeitschrift*, 28, 1975, pp. 120-123.
- Variability of Sea Surface Temperatures in the Southern Indian Ocean, W. Shenk and V.V. Salomonson, co-authors, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 35, 1974, pp. 143-148.
- A Multichannel Approach to Monitor Sea Surface Temperature from Space Along the Northwest Coast of Africa, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 35, 1974, pp. 363-364.
- Fernerkundung von Fischfanggrunden, *Umschau*, 74, 1974, p. 586.
- The Hot Spot in the Ross Sea: Upwelling During Wintertime, *Tethys*, 6, 1974, pp. 105-110.

Observation of Suspended Material from Spacecraft Altitudes, *Deutsche Hydrographische Zeitschrift*, 27, 1974, pp. 159-170.

Chemical Aspects in Delaware Bay, *Delaware Bay Report Series*, 4, 145, 1973, p. 170.

Heterogeneities in Salinity in a River Plume, with S. Kupferman, co-author, *Estuarine and Coastal Marine Science*, I, 1973, pp. 419-424.

Nordwestküste von Afrika beobachtet durch ERTS-1, *Umschau*, 73, 1973, text to cover page.

Validity of Ocean Surface Temperatures Monitored from Satellites, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 35, 1973, pp. 78-86.

Nimbus Observations of Oceanic Upwelling. In: *Significant Accomplishments in Sciences*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 1972, pp. 14-17.

Chlorophyll Structure in the Ocean, R.J. Curran, co-author. In: *Earth Resources Technology Satellite-1*, NASA Goddard Space Flight Center, Greenbelt, Maryland, 1972, pp. 139-141.

Upwelling Studies with Satellites, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 34, 1972, pp. 379-388.

Seasonal Sea Surface Temperature Variations in the Persian Gulf as Recorded by Nimbus 2 HRIR, with V.V. Salomonson and L.J. Allison, co-authors, *Limnology and Oceanography*, 17, 2, 1972, pp. 307-309.

Ozeanische Strukturen in Satellitenbildern, *Umschau*, 72, 1972, pp. 95-97.

Elemental Enrichment in Organic Films and Foam Associated with Aquatic Frontal Systems, with S.L. Kupferman, V. Klemas and D.F. Polis, co-authors, *Journal of Geophysical Research*, 77, 1972, pp. 5278-5282.

Satellite Ocean Temperature Analysis of the Indian Ocean, with W. Shenk, *Jour. Marine Biol. Ass.*, India, 14, 1972, pp. 102-108.

Oceanographic Applications of Color-Enhanced Satellite Imagery, with W.F. Mitchell, co-author, *Remote Sensing Environment*, 2, 1972, pp. 71-76.

Conditions Ecologiques dues à l'Evaporation dans les Etangs de Camargue, avec P. Kerambrun, *Hydrobiologie*, 37, 1971, pp. 273-283.

Remote Sensing of Ocean Currents and Sea Surface Temperature Changes Derived from the Nimbus 2 Satellite, with G. Warnecke, L.J. Allison and L.M. McMillin, co-authors, *Journal of Physical Oceanography*, I, 1971, pp. 45-60.

Anticyclonic and Cyclonic Eddies Near the Somali Coast, *Deutsche Hydrographische Zeitschrift*, 24, 1971, pp. 26-29.

Monsoonal Response in the Western Indian Ocean, with W. Duing, co-author, *Journal of Geophysical Research*, 76, 1971, pp. 4181-4187.

Liberated Energy Potentially Available from Oxidation Processes in the Arabian Sea, *Deep-Sea Research*, 17, 1970, pp. 641-646.

Ein Einfluss vertikaler Bewegungsvorläufe auf die Konzentration Organischen Materials in Zirkulationszellen vor Küsten: Modellrechnungen, *Geochimica et Cosmochimica Acta*, 33, 1969, pp. 1233-1246.

Le Dosage du Carbone Particulaire et son Application dans le Golfe du Lion, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 32, 1969, pp. 318-343.

The Application of a Chemical Model to Calculate the "Theoretical" Organic Carbon in Sea Water. *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 33, 1969, pp. 14-19.

La Composition Élémentaire (C,H,N) dans *Sphaeroma serratum* et *S. hookeri* (Crustacea: Isopoda), *Marine Biology*, 1969, pp. 352-356.

Effets eutrophiques débouché d'un grand fleuve (Grand Rhône), F. Blanc, M. Leveau et K.H. Szekiela, *Marine Biology* 3, 233-242, 1969.

Influence des Modifications Hydrologiques sur le Peuplement de *Sphaeroma* dans l'Etang de Berre, avec P. Kerambrun, *Cahiers de Biologie Marine*, 1969, pp. 301-308.

Vergleichende Untersuchungen über den Gehalt an organischem Kohlenstoff im Meerwasser und dem Kalimpermanganatverbrauch, *Journal du Conseil Permanent International pour l'Exploration de la Mer*, 32, 1968, pp. 17-24.

The Transport of Organic Matter in the Bottom Water of the Ocean, *Sarsia*, 34, 1968, pp. 243-252.

Le Carbone Particulaire dans les Masses de l'Eau Profondes, *Marine Biology*, 2, 1968, pp. 71-72.

Situation Hydrologique et Distribution du Zooplankton dans le Nordouest de la Mer d'Arabie., avec M. Leveau, *Sarsia*, 34, 1968, pp. 285-298.

#### **Proceedings and Technical reports**

Spectral recognition of marine bio-geochemical provinces with MODIS, First Workshop on Remote Sensing of the Coastal Zones, 5-7 June 2003, Ghent, Belgium, *EARSeL*, 3 (2), 261-275.

Remote sensing of suspended matter in Long Island Sound. In: *Long Island Sound Research Conference Proceedings*, 2004, pp. 55-59.

Satellite Monitoring of Particulate Matter in Long Island Sound, *Fourth Proceedings of the Long Island Research Conference 1998*, November 13-14, 1998, State University of New York, Purchase, New York, pp. 95-105.

Marine and Coastal Resources Monitoring with Satellites. In: *Remote Sensing and Its Impact on Developing Countries*, ed. by C. Chagas and V. Canuto, Pontifical Academy, Vatican City, 1987, pp. 291-339.

Satellite Remote Sensing for Developing Countries. In: *Remote Sensing and Its Impact on Developing Countries*, ed. by C. Chagas and V. Canuto, Pontifical Academy Vatican City, 1987, pp. 553-561.

Space Observations Over Fishing Grounds. In: *COSPAR: The Contribution of Space Observations to Global Food Information Systems*, Pergamon Press, 1978, pp. 173-179.

Remote Sensing of Marine Resources, *Proceedings Information Session of Aerial/Spatial Remote Sensing and Marine Living Resources Management, Eurocean*, 1976, pp. 47-58.

General Chemistry of the Coastal Waters of the Mid-Atlantic Coast, *Proceedings of Estuarine Research Federation*, College Park, Maryland, 1974, pp. 153-163.

Biomass in the Upwelling Area Along the Northwest Coast of Africa as Viewed with ERTS-1, R.J. Curran, co-author, *Symposium on Significant Results Obtained from the Earth Resources Technology Satellite- 1, Technical Presentations, Section B*, 1973, pp. 1385-1401.

Temperature and Chlorophyll Patches in the Upwelling Along the Northwest Coast of Africa, *Proceedings, American Society of Photogrammetry Fall Convention*, Lake Buena Vista, Florida, 1973, pp. 664-714.



Upwelling Studies with Satellites. In: *Proceedings of the Symposium on Remote Sensing in Marine Biology and Fishery Resources*, Texas A & M University, 1971, pp. 271-293.

The effect of Cyclonic and Anticyclonic water movements on the Distribution of Organic Matter, *NASA Technical Report*, X-622-70-40, Goddard Space Flight Center, Greenbelt, Maryland, 1970.

The Development of Upwelling along the Somali Coast as Detected with the Nimbus 2 and Nimbus 3 Satellites. *NASA Technical Report*, X-651-70-419, 1970, 52 pp.

Le Dosage Simultané du Carbone de l'Hydrogène de l'Azote dans le Matériel en Suspension dans l'Eau de Mer, Note Technique, 1968.