



**BRICS IN THE ARCTIC: EMERGING OPPORTUNITIES
FOR COLLABORATIVE INITIATIVES**

Organized by Dr Maria L Lagutina and Dr Sérgio C Trindade

**IMPACTS OF GLOBAL CLIMATE CHANGE
ON INDUSTRIAL AND ARTISANAL FISHERIES,
AND CULTURE OF MARINE FISH: GLOBAL
ROLE OF **BRICS****

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ALREADY STARTED COLLABORATIVE INITIATIVES

Impacts of global climate change on industrial and artisanal fisheries, and culture of marine fish: global role of **BRICS**

- 1) Industrial fisheries
- 2) Artisanal fisheries
- 3) Marine fish culture

GENERAL COORDINATION OF INTERNATIONAL COOPERATION - CGCIN / CNPq- (Brazilian Federal Government Science and Technology Sponsor)

Joint call CNPq / BRICS No. 18/2016

- ▶ DEVELOPED COUNTRIES: ALREADY HAVE MATURE CONSERVATION AND MANAGEMENT PROCEDURES
- ▶ **BRICS**: Russia and China, more developed and active fishing industries;
- ▶ **BRICS**: Brazil, India, South Africa, more developed artisanal fisheries

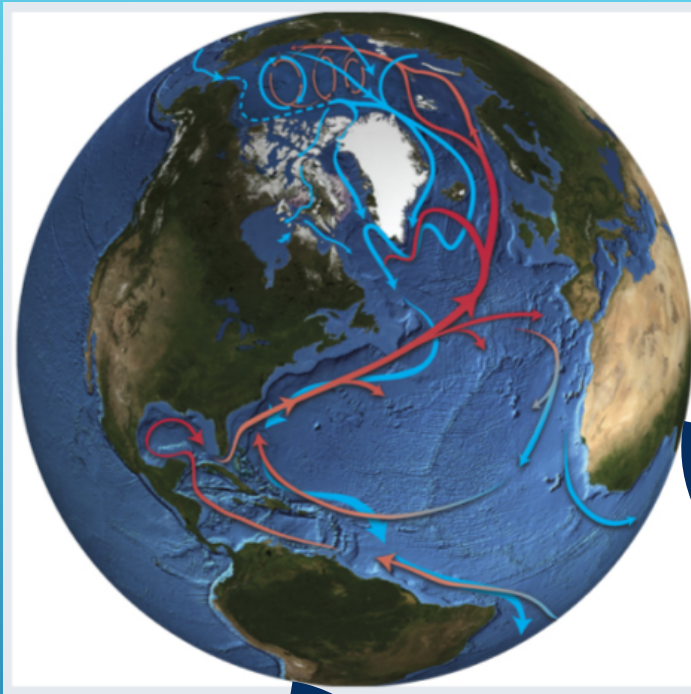
*POTENTIAL FOR CHANGES IN THIS
PANORAMA: **GLOBAL CLIMATE CHANGE**
AND ECONOMIC PRESSURE*

**BRICS – ECONOMIC CRITERIA
(DEVELOPING ECONOMIES)**

QUESTION:

IS THERE A WAY TO PERFORM
COLLECTIVE MANAGEMENT
ACTIONS, GOOD FOR THE
BRICS AND THE EARTH?

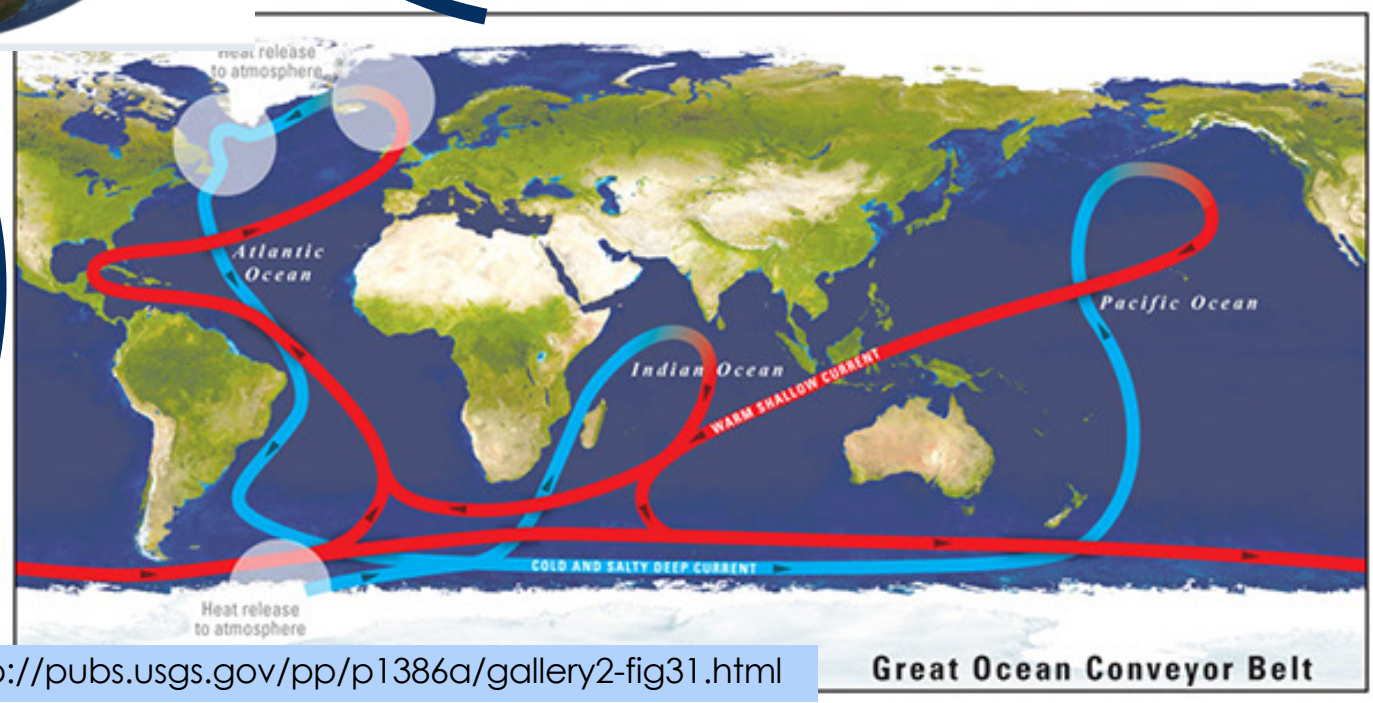
GLOBAL CONNECTEDNESS...
ARCTIC AND THE GLOBE



OCEANS MEAN:

Connectedness

ESPECIALLY
RELEVANT FOR
LARGE PELAGIC
MIGRATORY
FISHES!



<http://pubs.usgs.gov/pp/p1386a/gallery2-fig31.html>



Timeline (log scale) of marine and terrestrial defaunation. The marine defaunation experience is much less advanced, even though humans have been harvesting ocean wildlife for thousands of years. The recent industrialization of this harvest, however, initiated an era of intense marine wildlife declines. If left unmanaged, we predict that marine habitat alteration, along with climate change (colored bar: IPCC warming), will exacerbate marine defaunation.

REVIEW

16 JANUARY 2015 • VOL 347 ISSUE 6219

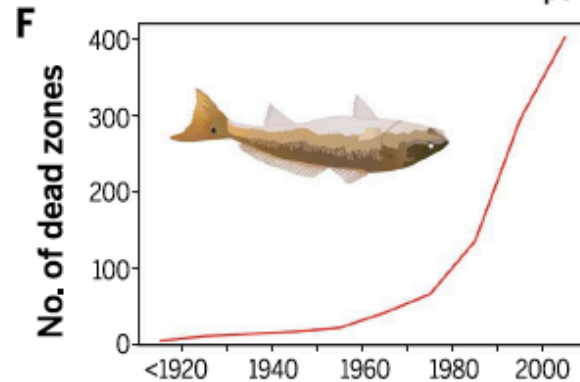
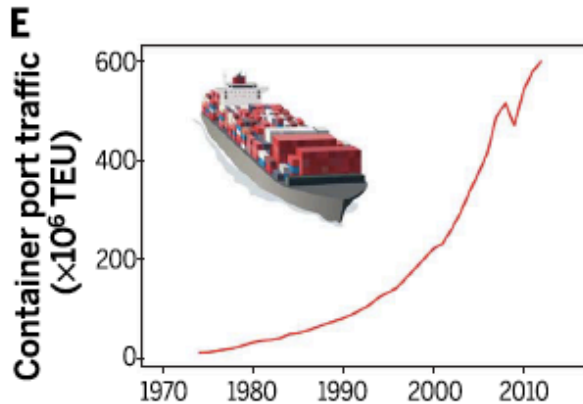
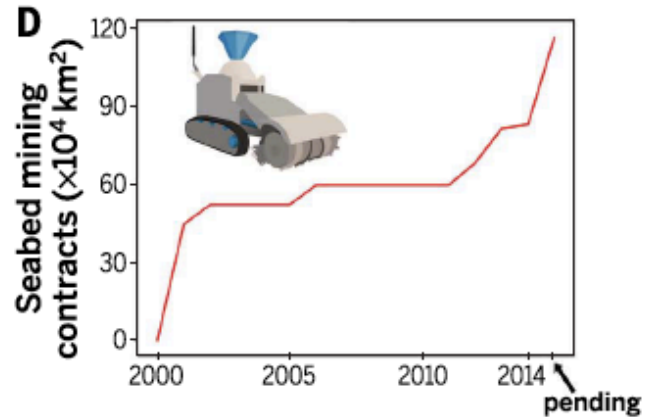
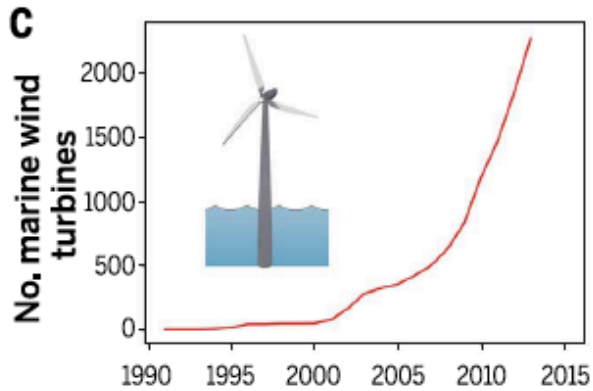
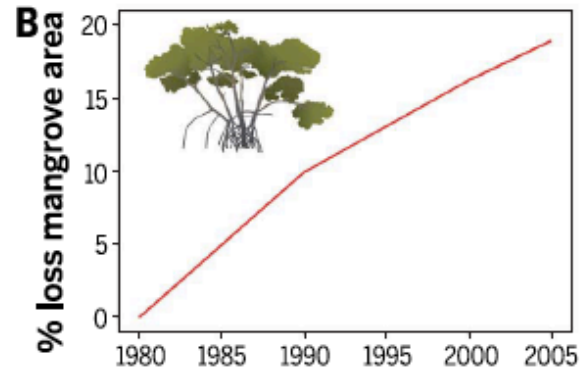
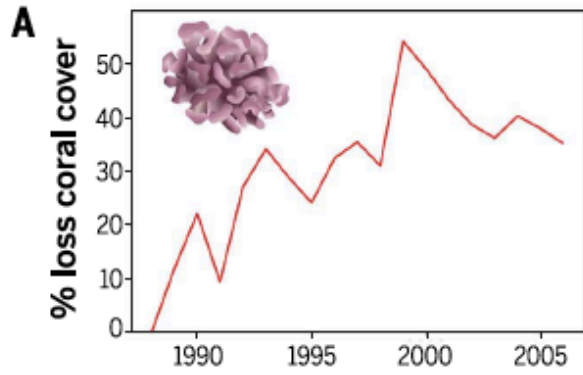
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MARINE CONSERVATION

Marine defaunation: Animal loss in the global ocean

Douglas J. McCauley,^{1*} Malin L. Pinsky,² Stephen R. Palumbi,³ James A. Estes,⁴ Francis H. Joyce,¹ Robert R. Warner¹

HABITAT CHANGE IN THE OCEANS, INCREASING THREAT TO MARINE LIFE



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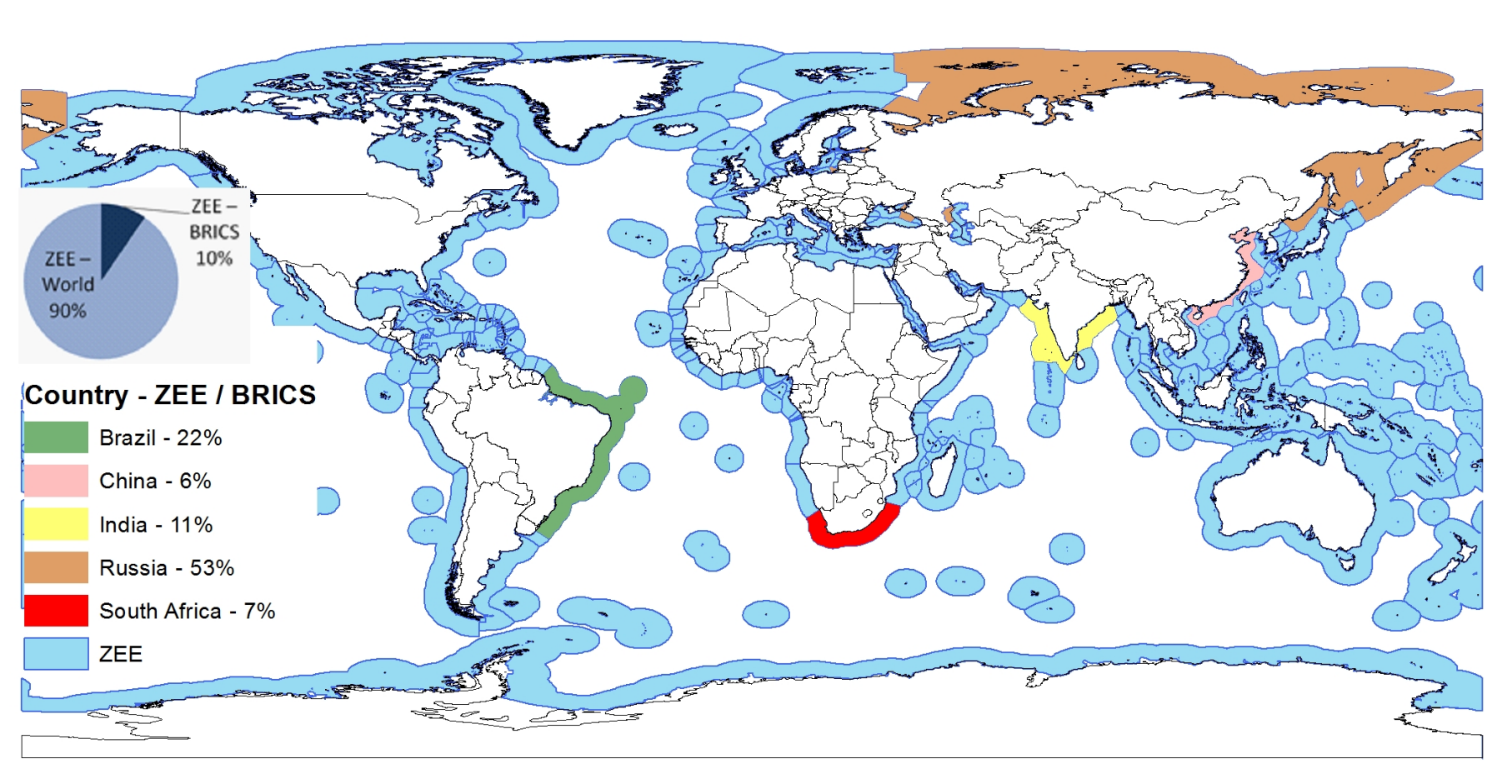
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▶ RELEVANT TO CONSIDER

- ▶ Overfishing
- ▶ Climate change pressure
- ▶ Examples: tuna, swordfish, billfishes, large sharks
- ▶ Migratory fishes (*duty to cooperate to manage fisheries resources, 1982 UN Convention on the Law of the Sea*)
- ▶ Regulatory tools (zones of maritime jurisdiction: Territorial sea, the contiguous zone, the Exclusive Economic Zone, the continental shelf)

INDUSTRIAL FISHERIES

ECONOMIC EXCLUSIVE ZONES (EEZ) OF BRICS COUNTRIES



10% of the total

INDUSTRIAL FISHING, BRICS



SEA AROUND US
FISHERIES, ECOSYSTEMS & BIODIVERSITY

All fishing of tuna & billfishes by the fleets of Brazil in 2010 (Total: 33×10^3 t)

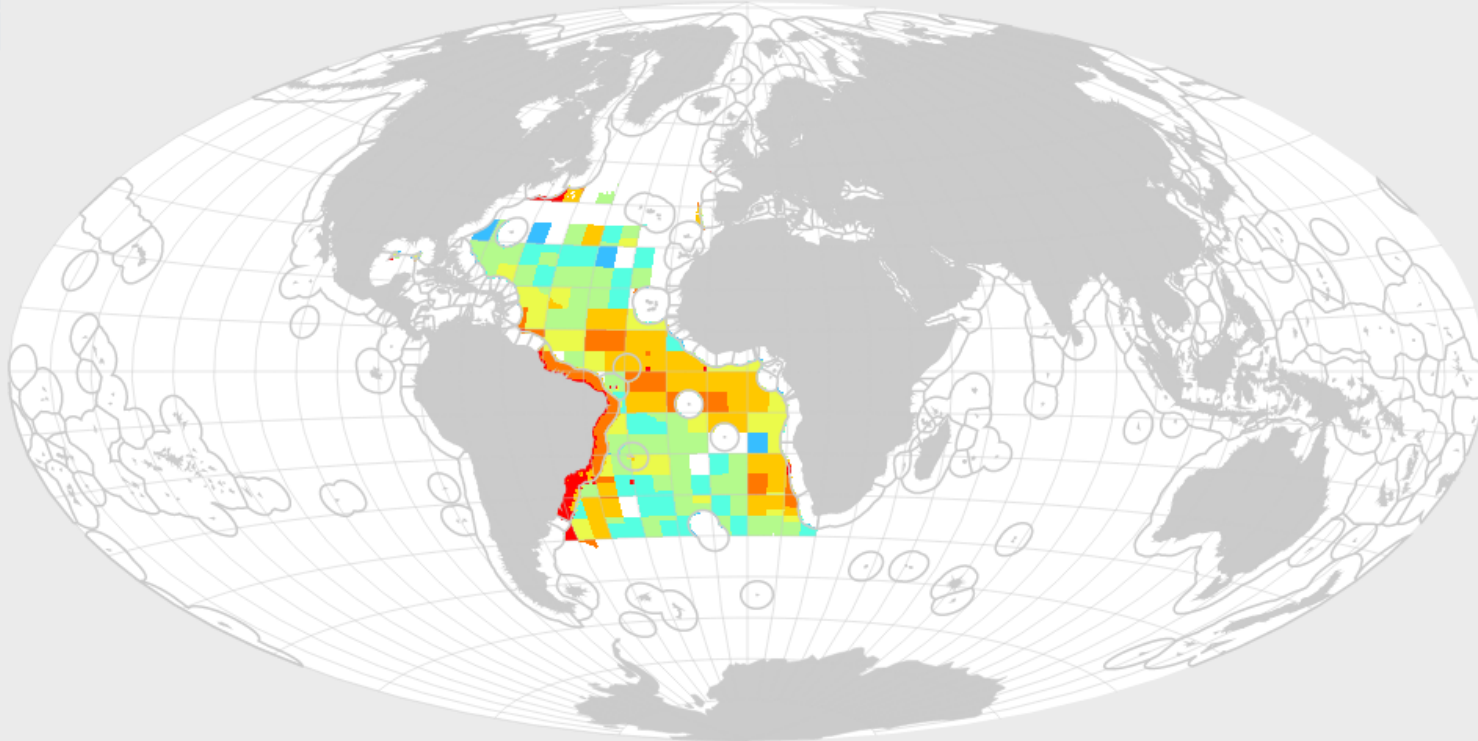


$1.8e-14$ t/km²

$1.1e+0$ t/km²

No catch

BRAZIL



**EXAMPLE: TUNA
AND BILLFISHES,
YEAR 2010**

**BRICS TOTAL SHARE IN
GLOBAL CATCH, TUNA AND
BILLFISHES, EXAMPLE 2010**

Still catching attention: Sea Around Us reconstructed global catch data, their spatial expression and public accessibility
D. Zeller n, M.L.D. Palomares, A. Tavakolie, M. Ang, D. Belhabib, W.W.L. Cheung, V.W.Y. Lam, E. Sy, G. Tsui, K. Zylich, D Pauly
Marine Policy 70 (2016) 145–152

All fishing of tuna & billfishes by the fleets of Russian Federation in 2010 (Total: 2×10^3 t)

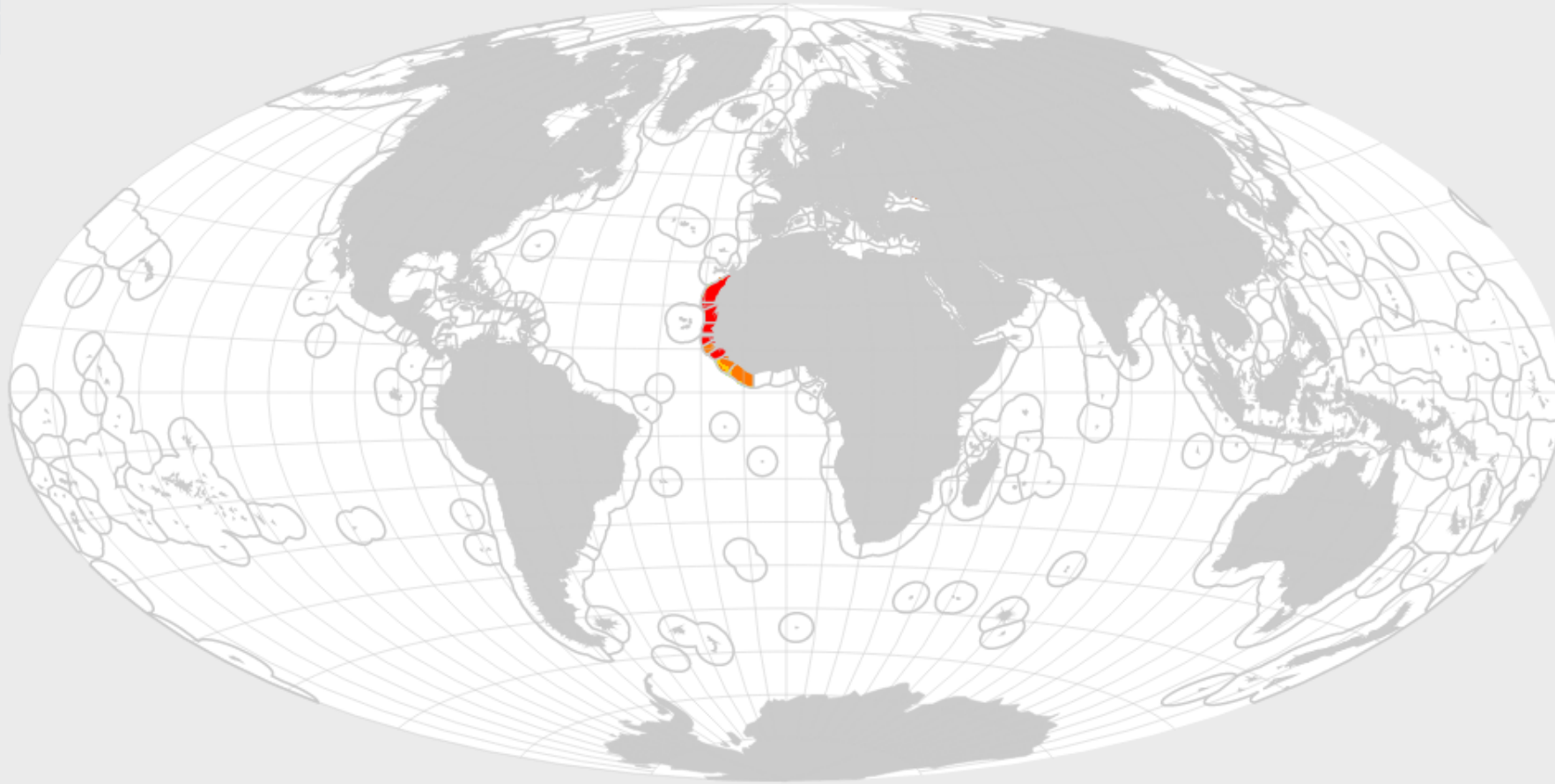


1.1×10^{-14} t/km²

1.5×10^0 t/km²

No catch

RUSSIAN FEDERATION



All fishing of tuna & billfishes by the fleets of India in 2010 (Total: 96×10^3 t)

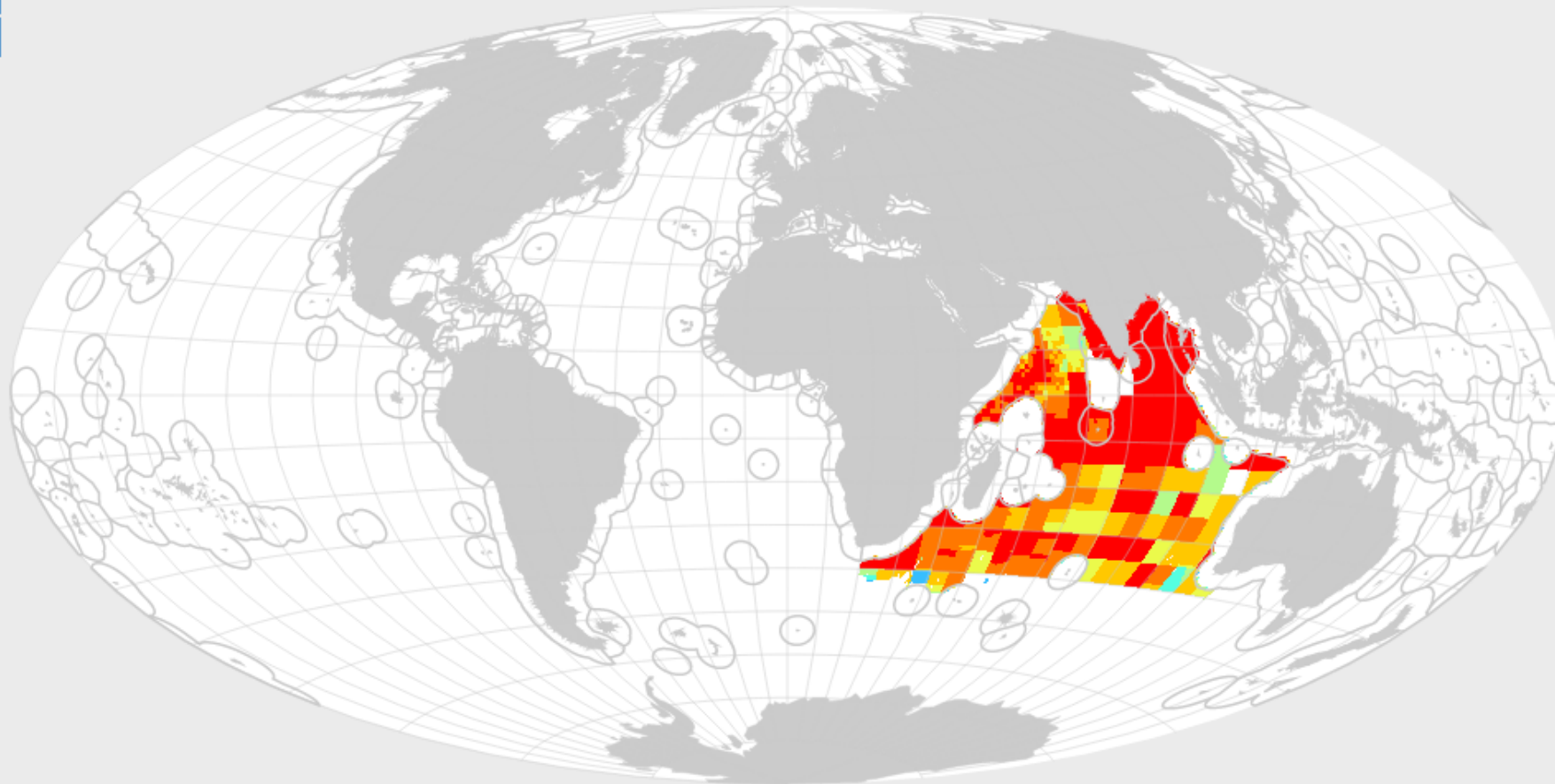


2.8×10^{-14} t/km²

5.9×10^0 t/km²

No catch

INDIA



All fishing of tuna & billfishes by the fleets of China in 2010 (Total: 145×10^3 t)

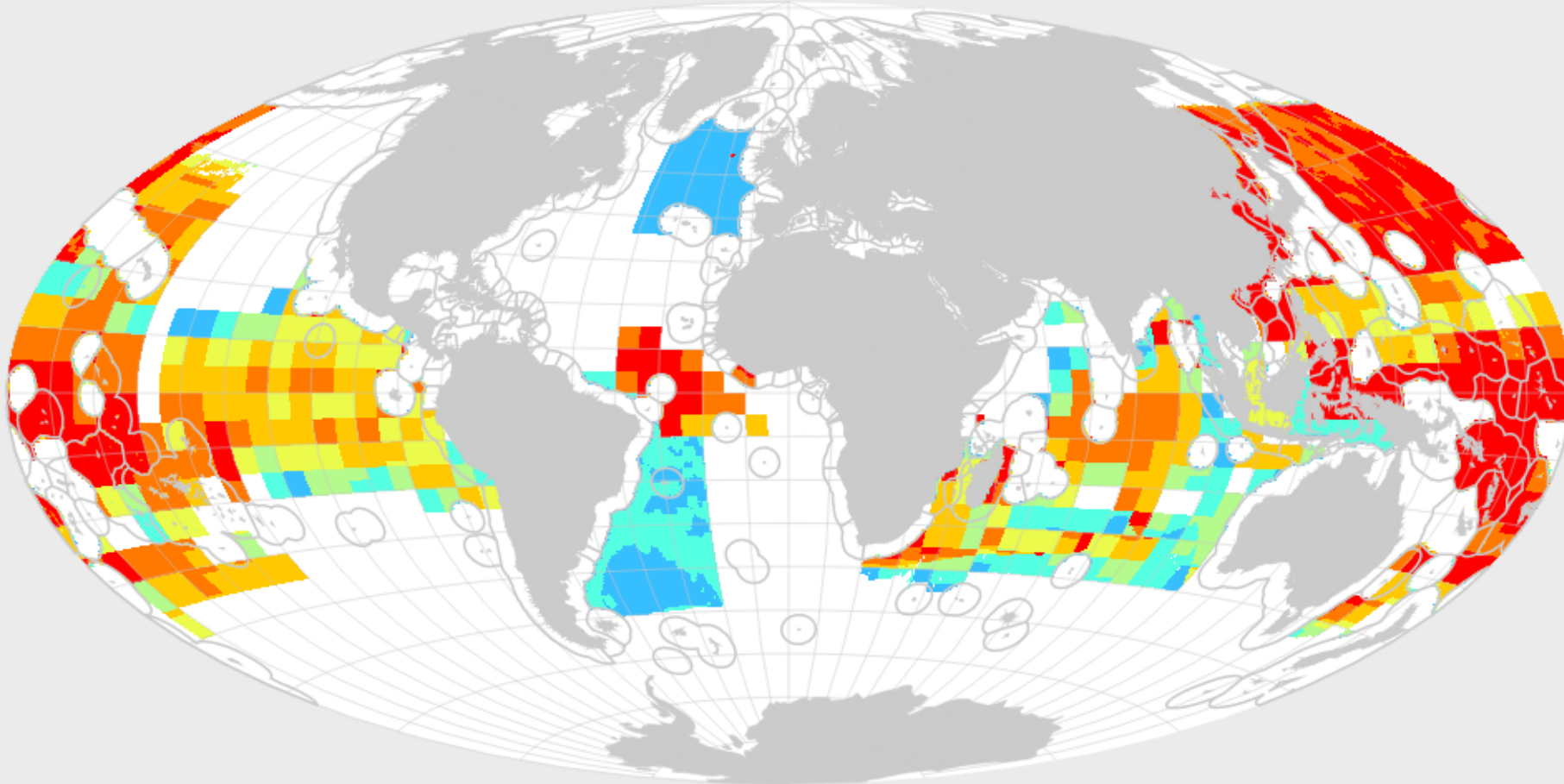


4.3×10^{-15} t/km²

1.5×10^0 t/km²

No catch

CHINA



All fishing of tuna & billfishes by the fleets of South Africa in 2010 (Total: 12×10^3 t)

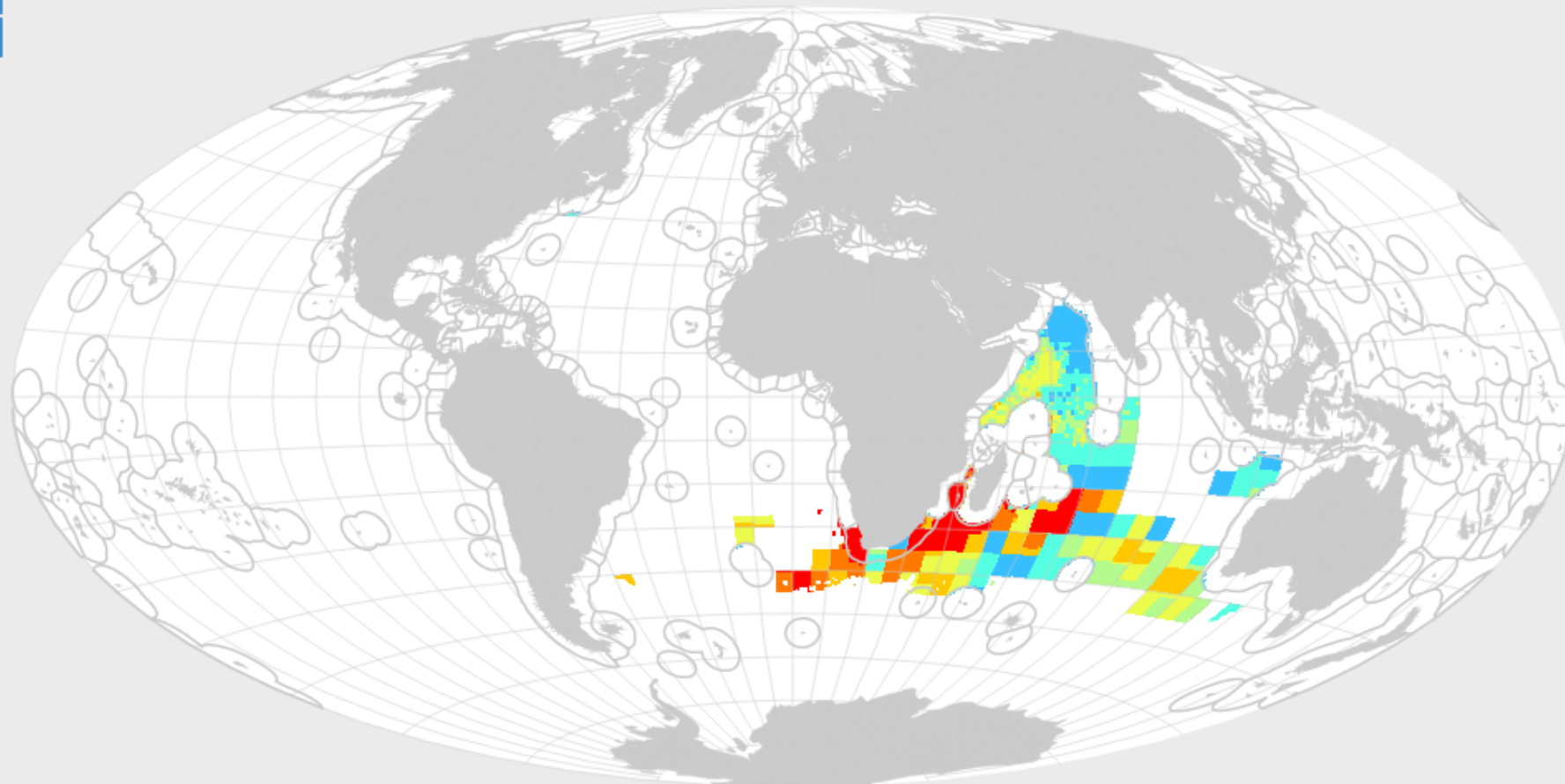


4.3×10^{-15} t/km²

1.6×10^0 t/km²

No catch

SOUTH AFRICA



BRICS COUNTRIES WILL HAVE TO SHARE BENEFITS AND BURDENS

**THESE WILL VARY ACCORDING TO
DIVERSITY AMONG THE BRICS
COUNTRIES, IN:**

- NATURAL RESOURCES**
- INSTITUTIONS**
- ECONOMIES**

For example: 'Rational use' in Antarctic waters

Jennifer Jacquet, Eli Blood-Patterson, Cassandra Brooks, David Ainley, *Marine Policy* 63 (2016) 28-34

HOW TO (RATIONALLY) USE TRANSBOUNDARY/TRANS-EEZ FISHERIES?

- creation and enforcement of Marine Protected Areas (MPA's)
- “incentive based fisheries management policies, spatially ambitious ecosystem-based management plans, and emerging efforts to preemptively zone human activities that affect marine wildlife”.
- “A second, complementary set of goals is to incorporate climate change into marine protected area schemes to build networks that will provide protection for ocean wildlife into the next century.”

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- ▶ Coordinated international planning and management in order to preserve the survival and vitality of marine ecosystems;
- ▶ Question society's emphasis on short-term gain;
- ▶ Uphold our international obligations.

McDougal, Myres S. and Burke, William T., "Crisis in the Law of the Sea: Community Perspectives Versus National Egoism" (1958). Faculty Scholarship Series. Paper 2462

Christopher C. Joyner, Biodiversity in the Marine Environment: Resource Implications for the Law of the Sea, 28 VAND. J. TRANSNAT'L L. 635, 637 (1995).

- ▶ Refinement of public data for the preparation of management plans of coastal and oceanic fisheries resources
- ▶ Support management actions for marine fisheries resources: pressures of climate change, overfishing, risk of oil exploration
- ▶ Changes in legislation so that resources are more sustainably explored (Diffuse rights)

INDUSTRIAL AND ARTISANAL FISHERIES

- ▶ Coastal: evaluate risk associated with oil exploration, pollution, and introduced species;
- ▶ Evaluate physiological plasticity; tolerance to environmental variability accompanying climate change (associated to previous risk factors).

MARINE FISH CULTURE: MITIGATION OF PRESSURE ON WILD STOCKS

▶ University of Bergen – Institute of Marine Sciences

▶ **B?** November 23-24 Seminar

- **Hjort Centre for Marine Ecosystem Dynamics**
 - **(R) joint research centres in Russia** (St Petersburg, www.niersc.spb.ru)
 - **(I) India**, Cochin: www.nerci.in
 - **(C) Chinese Academy of Science** in the Nansen-Zhu Centre in Beijing
 - **(S) Cape Town** in the joint Cape Town-Bergen research centre “The Nansen-Tutu Centre” www.nansen-tutu.org

**ARCTIC CONNECTIONS:
NORWAY AND BRICS**

- ▶ Seminar of the “Norwegian Forum for development of cooperation in Fisheries, Aquaculture and the Aquatic Environment” in November 2016
- ▶ The theme of this year’s seminar:
 - ▶ ***“Private Sector Development in Aquaculture; Potentials in developing countries”***.

OTHER ARCTIC PARTNERS: NORWAY
(UNIVERSITY OF BERGEN)

NETWORK OF COLLABORATORS – JUST STARTING!

BRAZIL

Dra Carolina A Freire, Dr Flavia D F Sampaio, MSc Natascha Wosnick, Dr. Hugo Bornatowski, Dr Fabio Hazin, Dr. Matheus Freitas, Dr Alberto Amorim, Dr Rodrigo Barreto, Dr Leonardo Sandrini Neto, Dr Vinícius Cerqueira, Dr Paulo de Tarso Chaves, Dra Marta M Souza, Dr. Ricardo Robaldo, o Dr. Luis Sampaio, Dr. José Monserrat

INDIA

Dr Biswaranjan Paital

SOUTH AFRICA

Dr. Edmund Pool

RUSSIAN FEDERATION

Dr Nikolai Dobronravin, Dr. Andrey Alimov

CHINA – to be added

NORWAY

Dra Celma Hellebust e Dra June Doornich

USA, CANADA

Dr. Nigel Hussey, Dr. Neil Hammerschlag, Dr. Michael Musyl

