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Oceans economy and trade:
Sustainable fisheries, transport and tourism

Responding Effectively to Diverse Environmental Challenges for Maritime Transport

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Outline

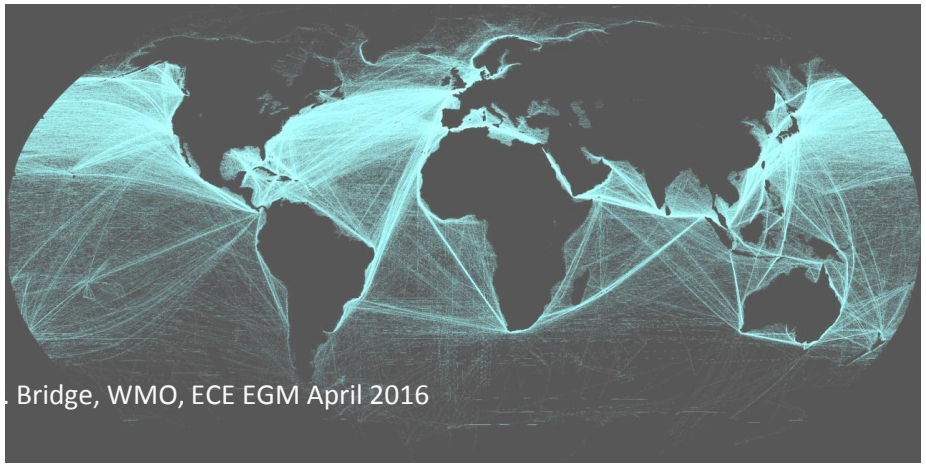
Maritime Transport and the Marine Environment

Effects of maritime transport on the marine environment

Impacts of CV &C on Maritime Transport

Relevance in the context of the SDG 2030 Sustainable Development Agenda

Maritime Transport and the Marine Environment



Global shipping movements

Maritime Transport facilitates global trade: Carriage of 80% of the volume -70 % of value of merchandise trade (port to port)

Globalization: interconnectedness/interdependence of shipping/ports

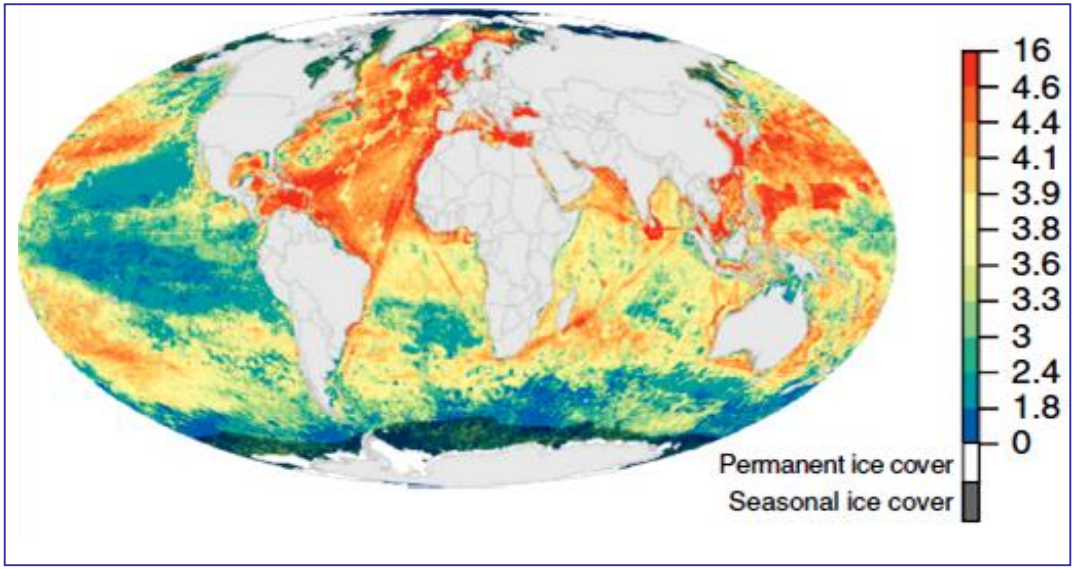
More than 60% of goods loaded and unloaded in developing countries

Environmental challenges: two sides of the coin

- **Effects of maritime transport on the marine environment** (e.g. pollution)
- **Environmental impacts on maritime transport** (particularly Climatic Variability and Change)

Important to address these global challenges effectively, also in the light of the 2030 Sustainable Development Goals

Cumulative human impacts on the ocean (2013)



Impact scores based on 19 anthropogenic stressors. Colors assigned to 10-quantiles in the data, except the highest scores which are the top 5% of scores (Halpern et al., 2015)

97.7% of the ocean affected by multiple stressors.

'Hotspots' of cumulative impact in e.g. the North Sea and South/East China Seas.

Nearly 66% of the ocean and 77% of national jurisdictions show increased human impact in the period 2008-2013 driven mostly by CC.

High sea surface temperatures and ocean acidification dominate human footprint on the open ocean, with commercial fishing and shipping also contributing significantly to overall impact

(Halpern et al., 2015)

Effects of maritime transport on the marine environment: ship source pollution

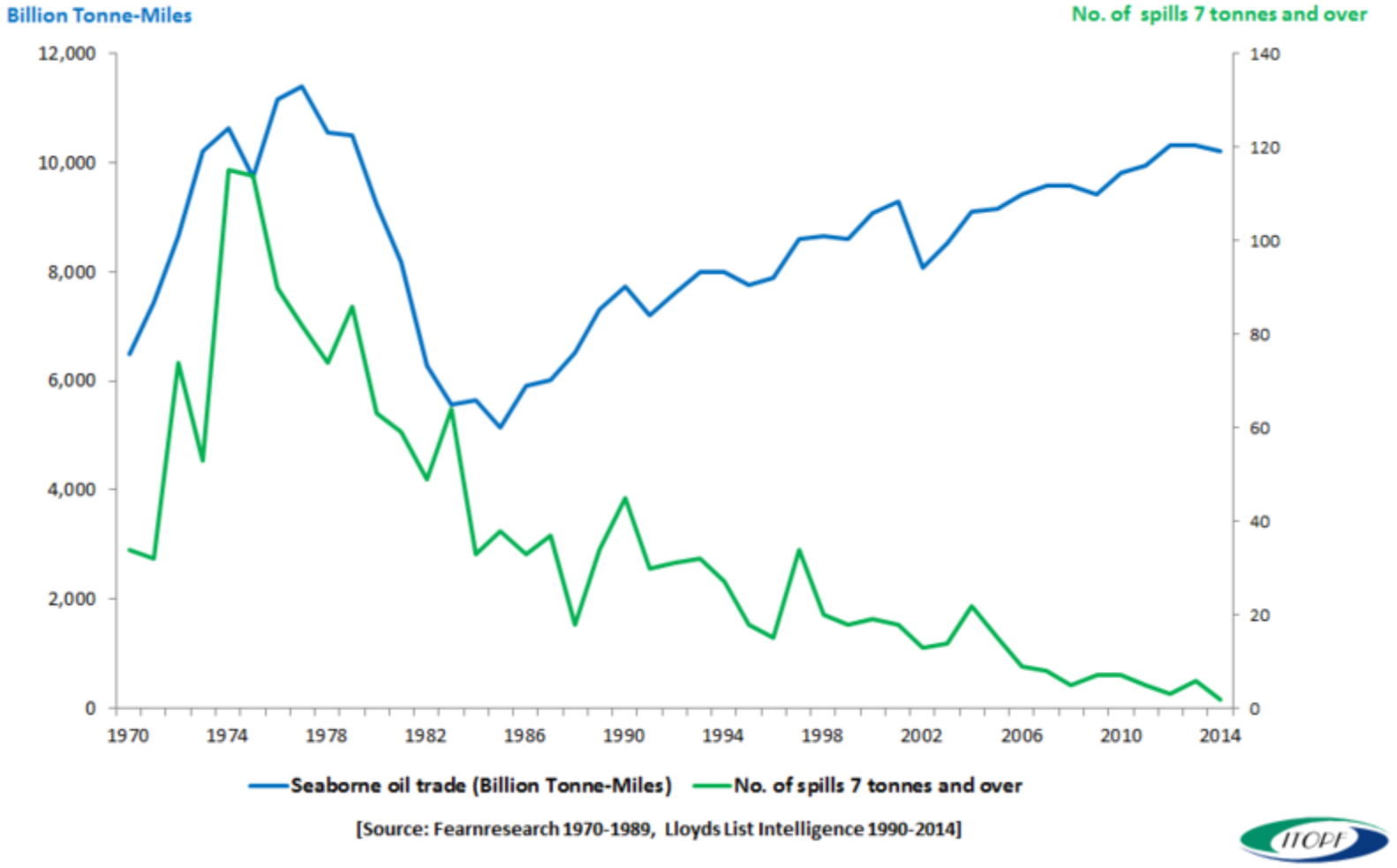
There are no natural borders in the marine environment; pollution does not recognise man-made borders

The seas as 'Global Highways'- potential pollution from shipping (operational, accidents)

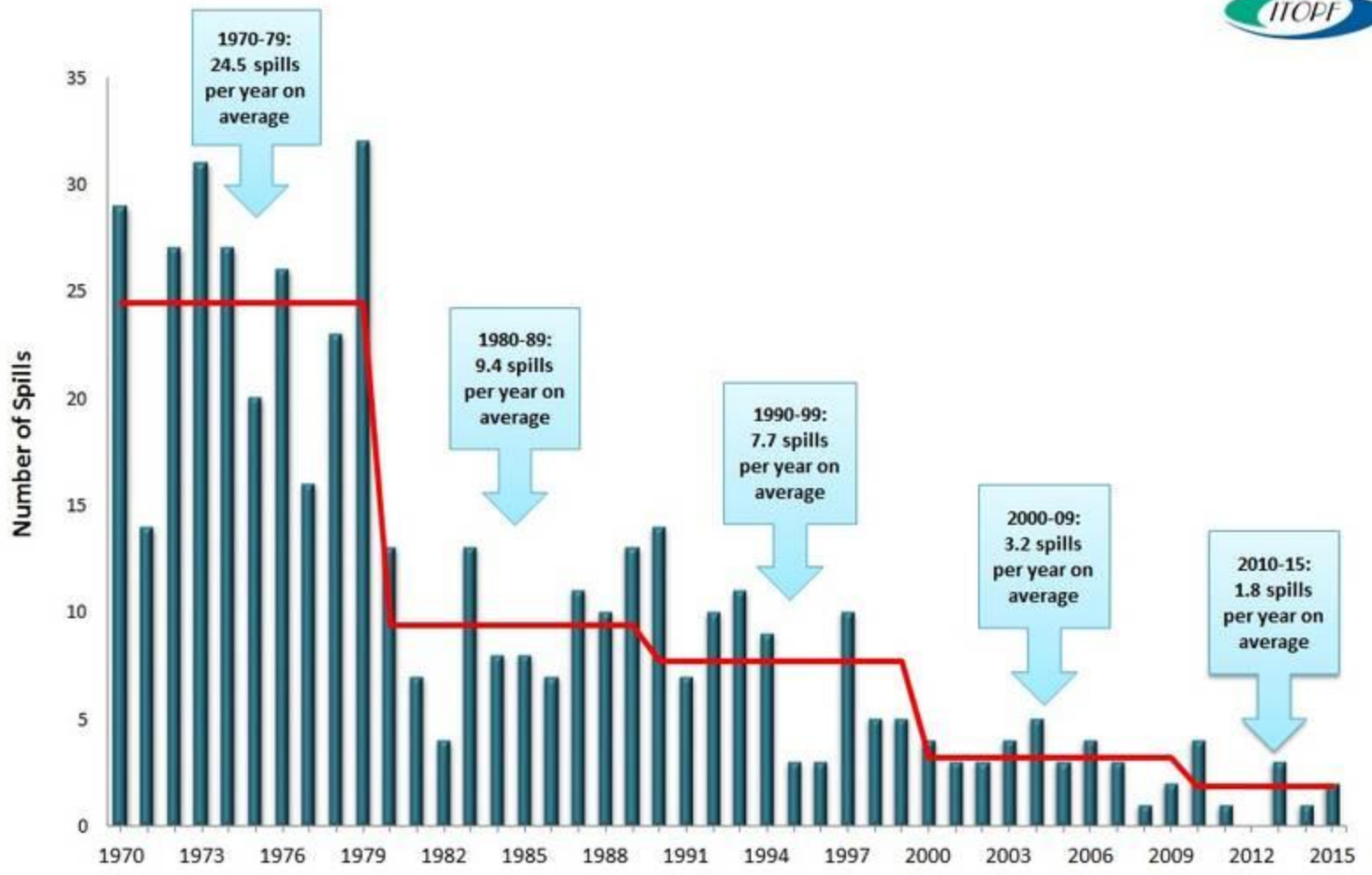
Ship-source Pollution: a threat to economic activities and to marine ecosystems

International legal framework to prevent and control ship source pollution: can be highly effective in implementing international policy objectives

Example: oil pollution from tankers significantly reduced since 1970s as a result of international conventions on oil pollution prevention, preparedness and response, and liability and compensation (See also UNCTAD, Liability and Compensation for Ship-Source Oil Pollution, UNCTAD/DTL/TLB/2011/4)



Seaborne oil trade and number of tanker spills over 7 tonnes, 1970 to 2014 (ITOPF, 2016)



Number of large oil spills from tankers > 700 tonnes (1970-2015) – Source: ITOPF, 2016

Climate Variability and Change

- A global challenge and "*a defining issue of our era*" (UN SG)
- Increasingly compelling scientific evidence (IPCC AR5, 2013)
- Huge potential costs associated with inaction (5-20 % of the Global GDP, annually (STERN Review 2006))
- A serious development threat particularly for the Least Developed Countries (LDCs) and the Small Island Developing States (SIDS)
- Since 2008, integration of climate change considerations into UNCTAD's work on transportation

  See unctad.org/ttl/legal for further information

CV & C implications for Maritime Transport

The Climate Change debate: two sides of the "coin": causes - effects

- **Mitigation**: action directed at addressing CC causes (long-term)

- **Adaptation**: action directed at coping with impacts of CV & C (short- and long- term); requires understanding of impacts, which vary considerably by type of forcing, region, sector etc.

In (Maritime) Transport:

- much of international debate/policy action focuses on CC mitigation (i.e. reduction / control of GHG emissions)
- Comparatively little focus on study of impacts and development of adaptation policies/actions

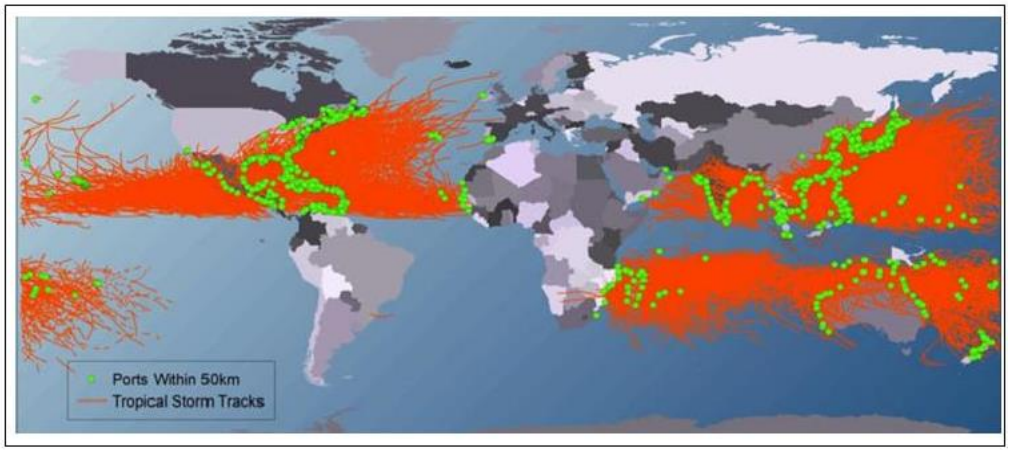
CV & C impacts on Maritime Transport

Climate change/extreme events likely to have *direct* and *indirect* impacts on maritime transport infrastructure and services

Sea-level rise, temperature and precipitation changes, extreme storms and floods and other factors are likely to

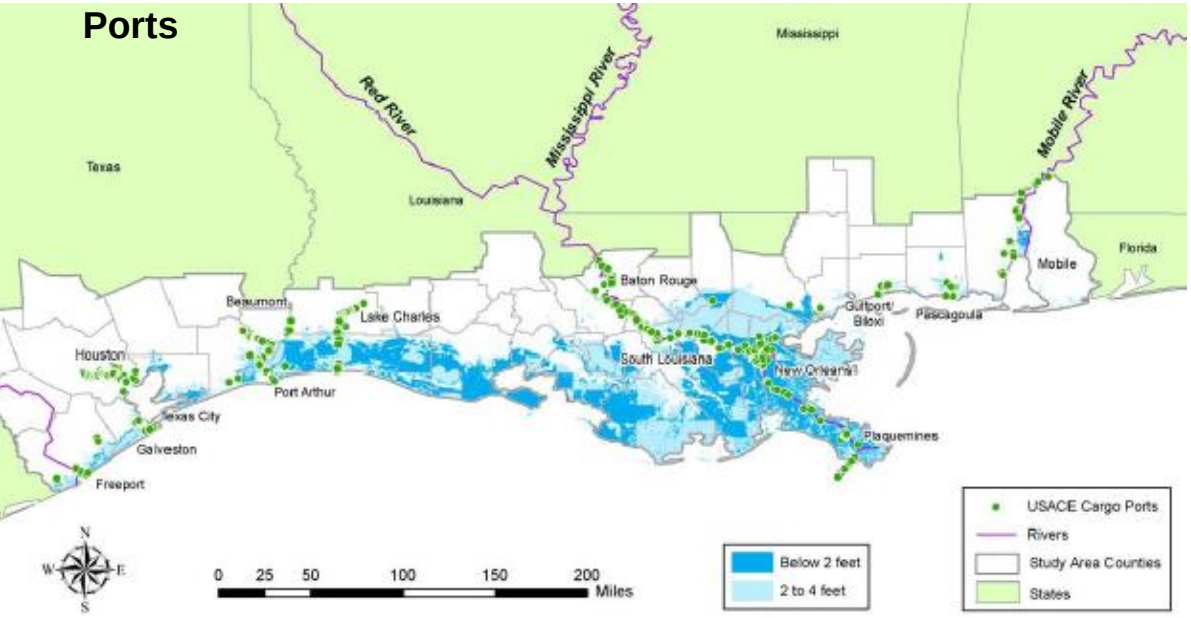
- affect ports and coastal transport infrastructure, hinterland transport and the broader supply-chain
- affect demand for shipping/transport costs/global production locations
- open new arctic sea-lanes due to polar ice melting

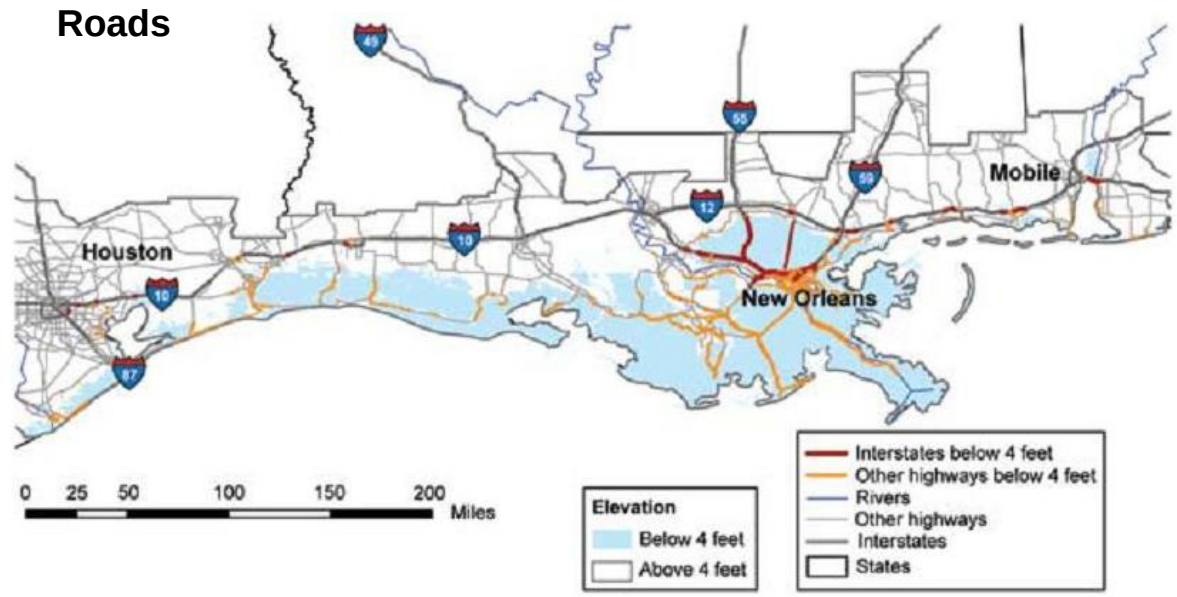
Shipping and seaports are vulnerable to storms



Seaports within 50 km of tropical sea storm tracks (1960–2010). Port and storm data from National Geospatial-Intelligence Agency (2011) and Knapp et al. (2010). (Becker et al., 2013)

Port of Providence (RI, USA): Flood simulation due to a Category 3 storm surge (26 f of surge) and 0.5 m mean sea level (MSL) rise (Becker et al. 2014, http://dx.doi.org/10.1016/j.progress.2013.11.002)





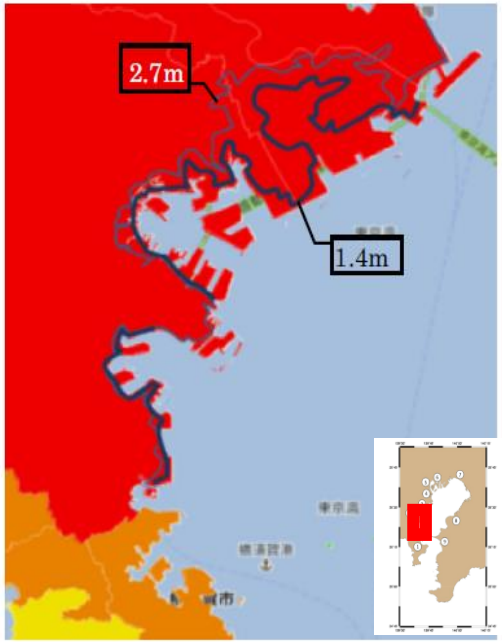
US Gulf Coast study (US DOT)

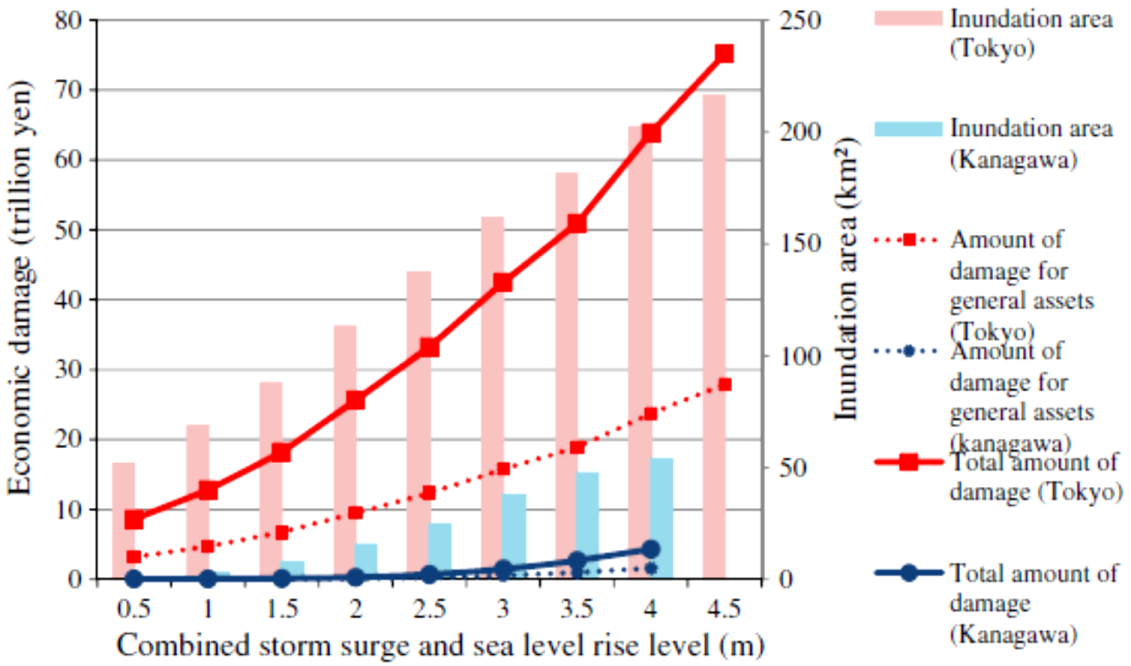
Flood risk at US Gulf coast under sea level rise 0-6-1.2 m.

Relative sea level rise of about 1.2 m (4 feet) could permanently inundate:

- more than 2400 miles of roads,
- over 70% of the existing port facilities,
- 9% of the railway lines and
- 3 airports.

Projected port city damages due to combined MSL rise and storm surge





(a) Areas at flood risk in the Kanagawa area (Tokyo Bay) for the mean expected storm surge due future storm typhoon in the year 2100 for a 0.59-m (thick blue line) and 1.9-m (thin blue line) mean sea-level-rise (MSLR) scenarios and

(b) Simulated damages for Tokyo and Kanagawa port areas due to combined MSLR and storm surge (Hoshino et al., 2015) (*30 trillion yen about 250 billion US dollars*)

Major climate change impacts on ports

Factor	Impacts
Sea level (mean and extreme)	**Open sea ports, estuarine ports (and inland waterway ports)**
• Mean sea level changes • Increased destructiveness of storms/storm surges • Changes in the wave energy and direction	Damages in port infrastructure/cargo from incremental and/or catastrophic inundation and wave regime changes; higher port construction/maintenance costs; sedimentation/dredging issues in port/navigation channels; effects on key transit points; increased risks for coastal road/railway links; relocation of people/businesses; insurance issues
Precipitation	
• Changes in the intensity and frequency of extremes (floods and droughts)	Land infrastructure inundation; damage to cargo/equipment; navigation restrictions in inland waterways; network inundation and vital node damage (e.g. bridges); changes in demand
Temperature	
• Higher mean temperatures, • Heat waves and droughts • Increased spatio-temporal variability in temperature extremes	Damage to infrastructure/equipment/cargo and asset lifetime reduction ; higher energy consumption for cooling cargo; lower water levels and restrictions for inland navigation affecting the competiveness of estuarine ports (e.g. port of Rotterdam); reductions in snow/ice removal costs; extension of the construction season; changes in transport demand
• Permafrost degradation • Reduced arctic ice coverage	Major damages in infrastructure; coastal erosion affecting road and rail links to ports Longer shipping seasons-NSR; new shorter shipping routes-NWP/less fuel costs, but higher support service costs

The special case of the SIDS

Large dependency on imports (i.e. international transport)

High Transport costs (e.g. transport costs in Caribbean trade at least 30 % higher than the world average, see Pinnock and Ajagunna, 2012)

Coastal transport infrastructure (seaports and airports): critical lifelines for external trade, food, energy, tourism (cruise-ships and air transport)

These assets are threatened by sea level rise and extreme events (storms)

Strong nexus between transport and tourism: “Sea, Sun and Sand - 3S tourism“, often a very significant SIDS industry, is threatened by climate - driven coastal and beach erosion; the same applies to its facilitating transport infrastructure (i.e. seaports, airports, coastal access roads)

UNCTAD UNDA Project *"Climate change impacts on coastal transport infrastructure in the Caribbean: Enhancing the adaptive capacity of Small Island Developing States (SIDS)”*

Recent regulatory developments

Enhanced climate resilience / climate change adaptation for critical transport infrastructure is going to be key in achieving progress on many of the Sustainable Development Goal and targets

- Legal / regulatory approaches will be important in the longer run
- Some examples already in existence, e.g.

- US: Executive Order (EO)13653 on Preparing the United States for impacts of climate change (1 November 2013)

- EU: Amended EIA Directive (Directive 2014/52/EU of 16 April 2014, amending Directive 2011/92/EU); entry into force May 2017

Relevance in the context of the SDG 2030 Sustainable Development Agenda

2030 Agenda adopted in September 2015, effective as of 1st January 2016

Consensus by the international community on a 'plan of action' involving 17 sustainable development goals with 169 associated targets, which are '***integrated and indivisible, global in nature and universally applicable'***

Sustainable and resilient transport among the cross-cutting issues, of relevance for achievement of progress on several of the goals and targets, e.g.

SDG 14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development
SDG 13	Take urgent action to combat climate change and its impacts (acknowledging UNFCCC as the primary forum)
SDG 9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Relevant Sustainable Development Goals (SDGs) and targets

SDG	Target	Description
SDG 1	**1.5**	By 2030, build the resilience of the poor and those in vulnerable situations and ***reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters***
SDG 9	**9.1**	Develop quality, ***reliable, sustainable and resilient infrastructure,*** including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all
	9a	***Facilitate sustainable and resilient infrastructure development in developing countries*** through enhanced financial, technological and technical support to African countries, LDCs, LLDCs and SIDS
SDG 11	**11b**	By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, ***mitigation and adaptation to climate change, resilience to disasters,*** and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015-2030, holistic disaster risk management at all levels
SDG 13	**13.1**	***Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries***
	13.2	***Integrate climate change measures into national policies, strategies and planning***
	13.3	Improve ***education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning***
SDG 14	**14.1**	By 2025, prevent and ***significantly reduce marine pollution of all kinds***, in particular from land-based activities, including marine debris and nutrient pollution
	14.2	By 2020, ***sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts***, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans
	14c	***Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in UNCLOS, which provides the legal framework for the conservation and sustainable use of oceans and their resources***, as recalled in paragraph 158 of 'The future we want'

Session V: Sustainable and Resilient Maritime Transport Infrastructure and Services in Support of the SDGs

Session V presents approaches to effectively addressing diverse environmental challenges in support of the SDGs

(a) Effects of maritime transport on the marine environment (e.g. pollution)

(b) Environmental impacts on maritime transport (particularly Climatic Variability and Change)

Presentations

- Maritime transport: the international regulatory framework for pollution prevention
- Shipping industry approach to sustainable and resilient transport
- Climate Change impacts on maritime transport infrastructure: Assessing the risks
- Climate Change adaptation for coastal infrastructure: Ecosystems-based approach

Thank you!

International regulation to combat oil pollution from ships

- **Oil Pollution prevention**
  MARPOL 1973/78 (Annex I/II)
  - Entry into force 1983

- **Oil Pollution response**
  OPRC (Oil Pollution preparedness, response and cooperation) Convention 1990
  - Entry into force 1995
  OPRC-HNS (Hazardous and noxious substances) Protocol 2000
  - Entry into force 2007
  Intervention on the high seas in cases of oil pollution casualties Convention 1969
  - Entry into force 1975
  1973 Protocol (other substances)
  - Entry into force 1983

- **Liability and compensation for oil pollution damage: IOPC Fund regime (applicable to tankers)**
  1969 CLC and 1971 FUND Convention
  - Entry into force 1975 and 1978
  1992 CLC and 1992 FUND Convention
  - Entry into force 1996

  2003 Supplementary FUND Protocol
  - Entry into force 2005

Climate change and transport: relevant work by UNCTAD and follow-up (see unctad.org/ttl/legal)

2009 Follow-up	**UNCTAD Multiyear Expert Meeting: "*Maritime Transport and the climate change challenge*"** UNCTAD (ed.) Maritime Transport and the Climate Change Challenge Earthscan (Routledge/Taylor&Francis) (2012) 327 pp
2010 Follow-up	**Joint UNECE-UNCTAD Workshop:** **"*Climate change impacts on international transport networks*"** UNECE *Group of Experts on Climate Change Impacts and Adaptation for International Transport Networks* (2011-2014); mandate recently extended to 2017 2012 International Conference - including session on SIDS 2013 EG Report - *Climate Change Impacts and Adaptation for International Transport Networks*
2011 Follow-up	**UNCTAD Ad Hoc Expert Meeting**: **"*Climate change impacts and adaptation: a challenge for global ports*"** Academic paper co-published by Experts (2013) Becker et. al, A note on climate change adaptation for seaports, Climatic Change, 2013
Ongoing	**UNCTAD Port-Industry Survey on Climate Variability and Change**
2015-2017	**UNCTAD TA Project *"Climate change impacts on coastal transport infrastructure in the Caribbean: Enhancing the adaptive capacity of Small Island Developing States (SIDS)"***