TOPIC: *MICROPLASTICS: THE UNSEEN DANGER IN OUR WATERS?*

Presenter: Bahati Sosthenes Mayoma

Research interests: Aquatic ecology/ecotoxicology /pollution

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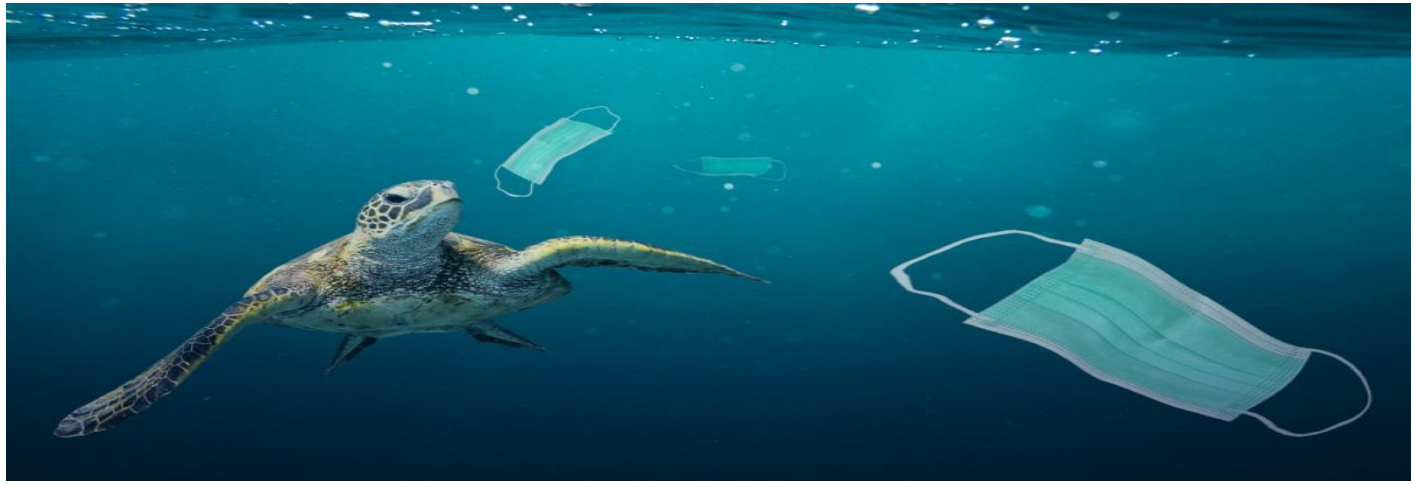
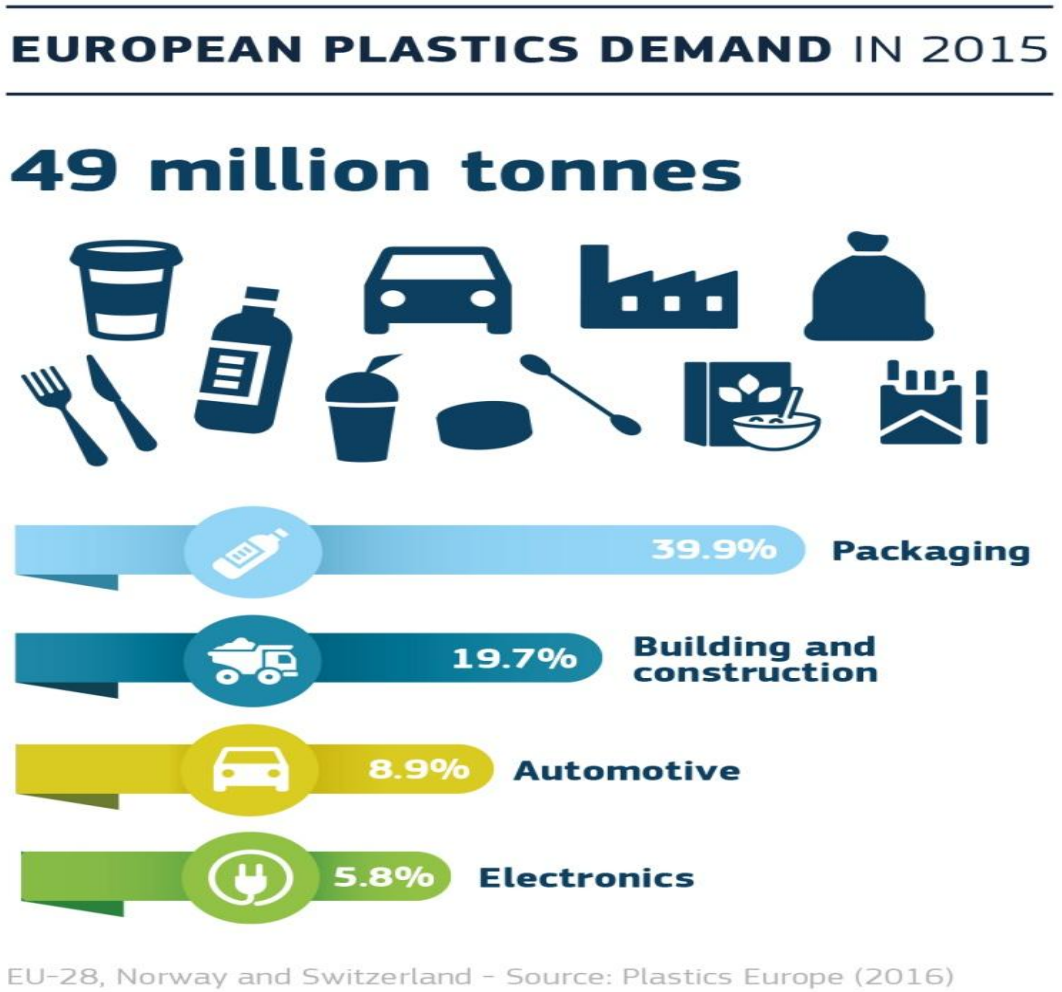


Plastic Background-Global perspective

- Plastic pollution has been widely reorganized as global environmental concern (Barnes et al., 2009) with devastating impacts on aquatic resources and economy (Lachmann et al., 2017).
- Currently about **350MT** are produced annually and could double by 2050 (Plastic Europe, 2018).
- Between **8-12MT** end up in the aquatic environment annually mostly from land- based sources (Jambeck et al. 2015), and **150MT** are floating in the oceans (WEF, 2016).
- In 2014 weight ratio Plastic vs Fish was **1:5** and projections show that by 2050 Oceans and lakes could probably have more plastic than fish by weight (WEF, 2016)

How important are plastic products?

- Plastics are applied in practically all industrial sectors
- About a third of plastic is used in packaging and roughly the same in buildings installation, pipes and plumbing.
- Other uses include automobiles, furniture, and toys.
- In the developing world, the applications of plastic varies between countries (*Plastic Europe 2015*)
- Only 10-12% are recycled globally



Negative Ecological effects

- Plastic items have been linked to:
- Ecological disturbances with so far ca. 800 species including fish reported to ingest or get entangled with plastics worldwide (CBD 2012).

- Spread of diseases, invasive species etc (Krystosik et al. 2020, Rasool et al.2020).
- Ingestion by the African favorite Fish such Nile perch and Tilapia (Biginagwa et al. 2016, Khan et al. 2020).
- Movement of POPs, PAHs, metals and PCBs from areas of production/use to pristine environments (Takada et al. 2013).

Economical & Health Implications

- Plastic pollution could affect tourism sector by making beaches less attractive
- Fisheries sector via habitat destruction, ingestion and entanglement
- Effect on fishing vessels e.g. engine propellers or steering system
- Spread of diseases e.g. multidrug resistance bacteria etc
- Spread of invasive species across continents or regions with different weather conditions
- Increase risk of exposure to metals and other toxic substances of health concerns (Mercury, pesticides, POPs, PCBs etc)

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Importance of Lake Victoria

- It's the world's second largest water body by surface area after Superior North America
- Transboundary shared by Tanzania (51%), Uganda (43%) and Kenya (6%)
- Home to hundred of species some of which are endemic
- Supports over 3Omillion people with direct and indirect job opportunities, water and other socio-economic or ecological services
- Play major role for FOREX via export of some fish species e.g. Perch, Sardines . TZ export more from fresh water than Indian Ocean

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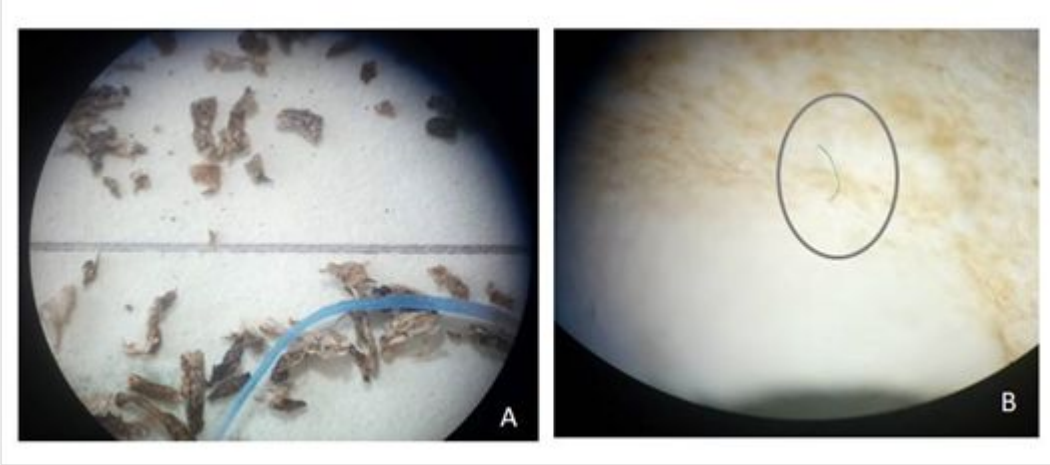
Status of Plastic pollution in L.Victoria

- Microplastics (MPs) are particles with <5mm size in various shapes and color
- Can be from primary source i.e manufactured intentiontionally
- Secondary sources i.e. broken from macro plastics (>5mm) items



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Status of Plastic pollution in L.Victoria

- So far 4 studies have been published (2 in Uganda, 2 in Tanzania)
- Macroplastic has been reported in various depths in TZ water with fishing gears representing about 95% by weight (*Ngupula et al. 2014*)
- Microplastic have been found in two fish species (Nile perch and Nile Tilapia B*iginagwa et al. 2016*)
- As well as in Sediment and water surface in Ugandan water (*Egessa et al. 2020&2021*)

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Litter challenges facing L.Victoria

- Different management options among member states
- Rapid growing population which generates more waste ending up in the Lake.
- Lack of reliable recycling option &clean up campaigns to capture or reduce waste before reaching the lake.
- Inadequate data due to few studies conducted in the lake compared to other global lakes of similar importance
- Lack of awareness among residents of L. Victoria basin on ecological, economical and health implication of Plastic litter.
- Little investment in **4Rs** approach as sustainable way of litter management

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MPs studies on the Africa continent& EAC

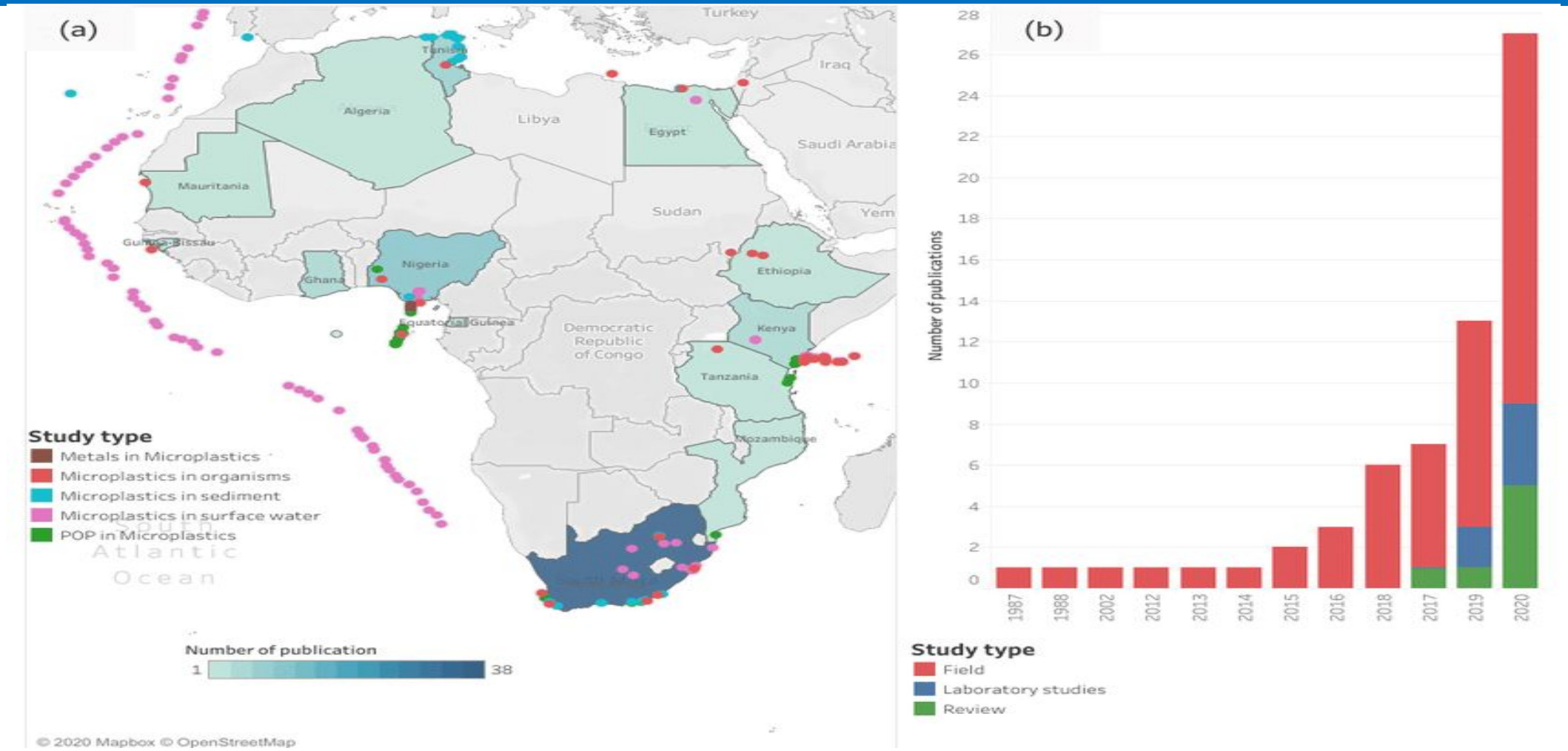

Fig 1. (a) Spatial distribution of microplastic publications across Africa (b) Distribution of yearly publication in Africa (Modified from Alimi et al. 2020)

MPs studies in regional blocks…..

LIVE on YouTube

Africa: Plastics research

Environmental Science and Pollution Research (2021) 28:7636–7651
https://doi.org/10.1007/s11356-020-11736-6

REVIEW ARTICLE

Plastic pollution threat in Africa: current status and implications for aquatic ecosystem health

Emmanuel Olusegun Akindele[1] · Chibuisi Gideon Alimba[2]

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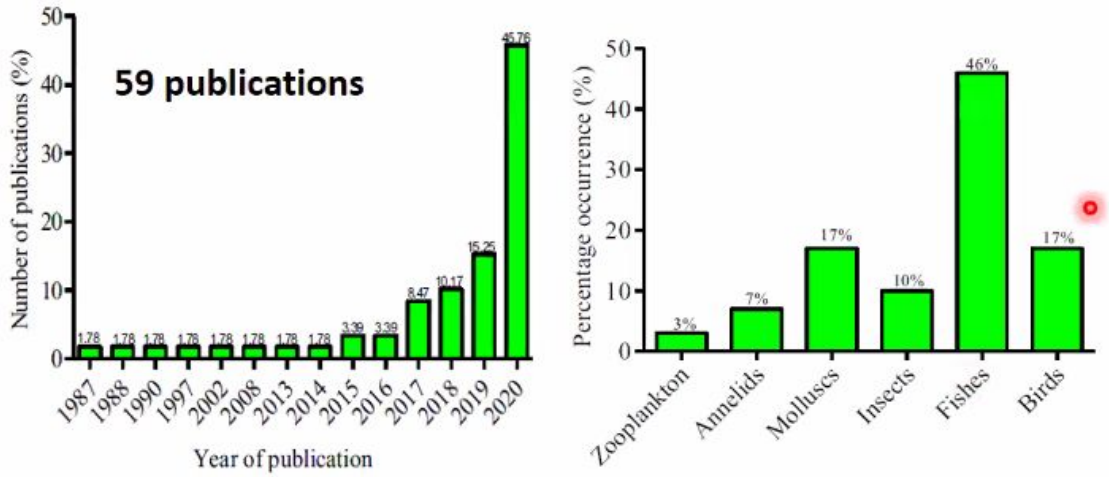
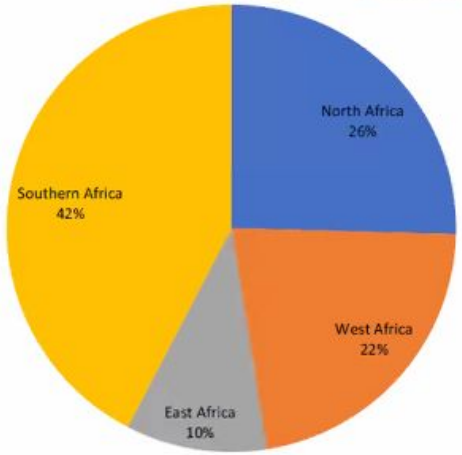
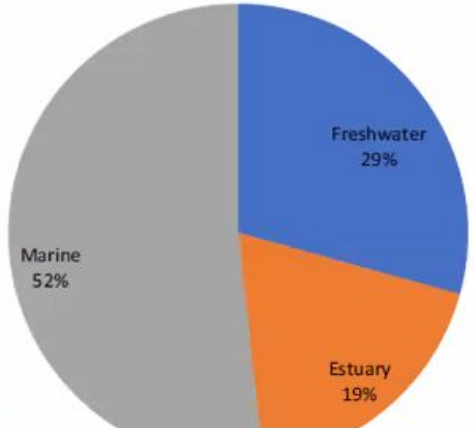


Cape Peninsula University of Technology





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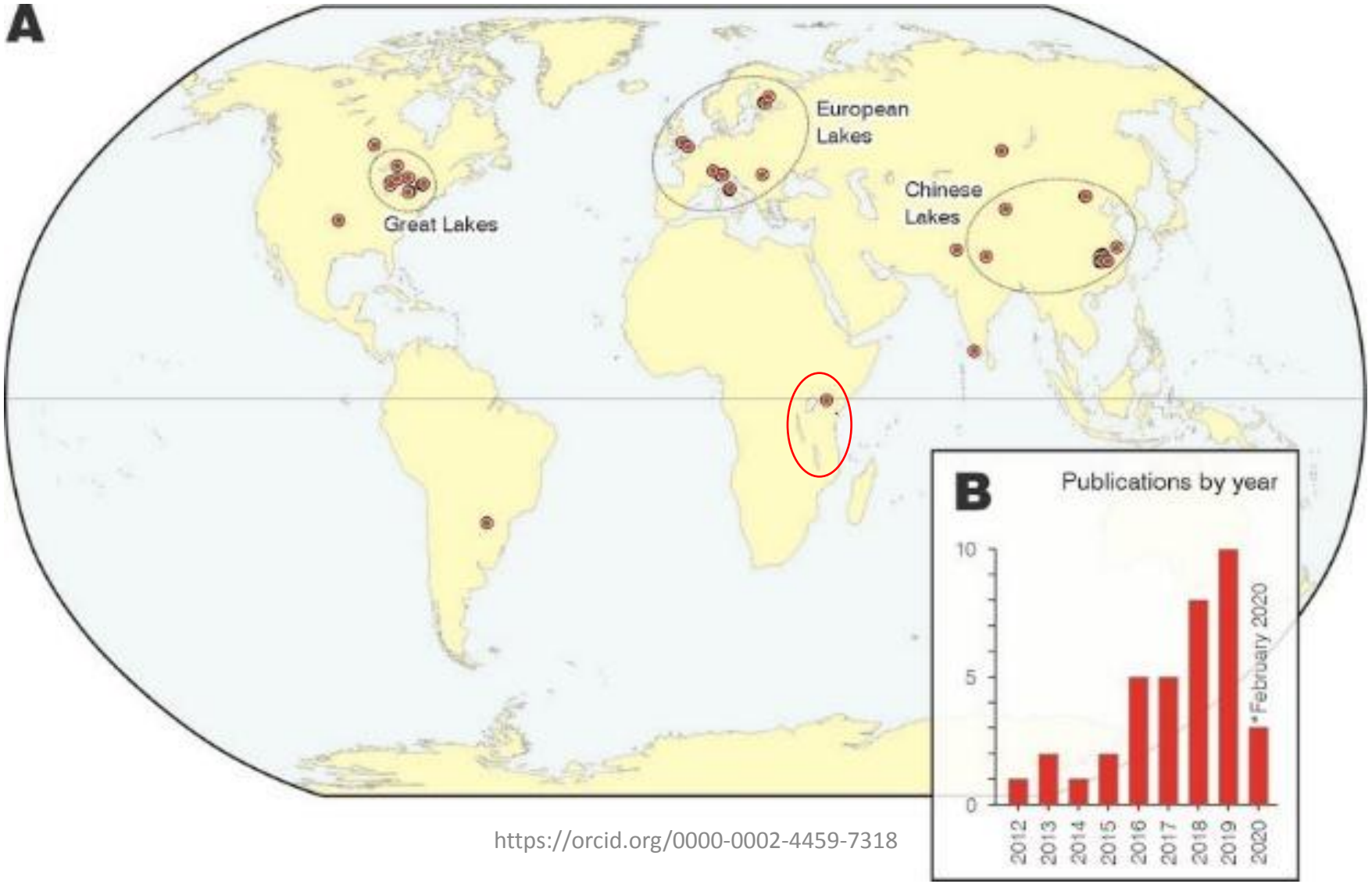
Africa on global map



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L.Victoria and Lamu expeditions

Lamu Archipelago 2022

Lake Victoria 2021

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Preliminary Findings From Lake Victoria Flip-flop expedition

- Plastics were recorded across all sites and depths up to 50m below
- Abundance ranged between 372-5500 MPs/Km2
- Overall Ugandan sites had the highest abundance
- ***Some remote areas far from urbanization had more plastic than previously thought***
- Overall fragments type of plastics were dominant categories followed by fibers which could be linked to both terrestrial and aquatic activities

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L.Victoria expedition route

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POSSIBLE SOLUTIONS

- Engage media for community awareness on illegal dumping of plastic and fishing gears in L.Victoria
- Promote the use of **4Rs (Refuse, Reduce, Reuse, Recycle)**
- Harmonized management policy among countries sharing resources
- Promotion of Circular economy as pillar for reducing litter problem
- Encourage people to use alternative items which serve same purpose as plastic
- More research works are needed to cover other water bodies in Africa

ASANTENI/THANK YOU

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