

Humpback whale songs in the Colombian Pacific and in the Tanzania Indian Ocean: same subpopulation and season but different song pattern

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INTRODUCTION

- Humpback whale *Megaptera novaeangliae* is a migratory species that feeds in polar and temperate areas in summer and breeds in tropical areas in winter¹ (Fig. 1).
- This whale inhabits the Colombian Pacific and the Tanzanian Indian Ocean to reproduce and breed: breeding behaviors and singing^{2,3}.
- Songs are complex vocalizations made by males for courtship purposes⁴.
- Humpback whales of Colombia and Tanzania belongs to the same Southern Hemisphere subpopulation, but according to their feeding areas in the Antarctica, Colombian whales belong to Stock-G and the Tanzanian whales to Stock-C (Fig. 1).

METHODS

- An analysis of song recordings of 2022 breeding season from Bahía Málaga, Colombian Pacific (October), and Zanzibar, Tanzania Indian Ocean (September), was conducted (Fig. 2). Songs were recorded for at least 15 minutes.
- Data collection was on board small vessels (<12 m) during daylight hours (Fig. 2).
- The presence, behavior and whale songs were recorded.
- Hydrophones were used to record the songs, in Colombia: SQ26-H1 Cetacean Research, and in Zanzibar: HTI-96-Min High Tech.
- Sonograms were standardized and characterized manually in the RavenPro program.

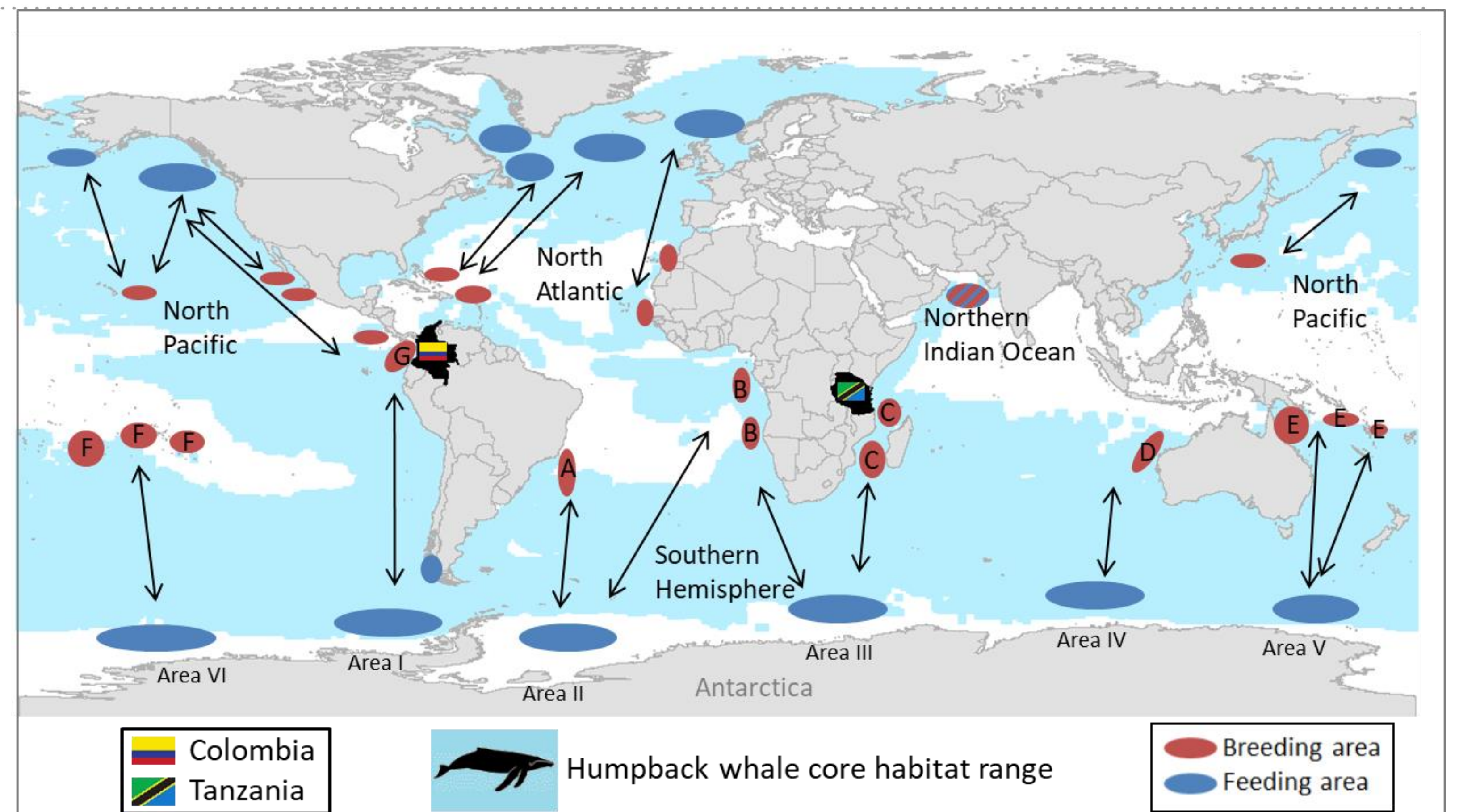


Fig.1 Migration routes of humpback whales between feeding areas (blue areas) and breeding areas (red areas), showing the location of Colombia (South America) and Tanzania (East Africa). Blue areas represent the core habitat for humpback whales⁵.

RESULTS

- Song of 2 humpback whales analyzed: 1 in Colombia and 1 in Zanzibar (Fig 2d).
- 17 different units for Colombian whale song (Fig. 3 left) and 16 for Tanzanian whale song grouped into three main themes (Fig. 3 right).
- The frequency range of the main signal harmonics ranged from 0.36-2.9 kHz with a maximum of 1170 Hz.
- There are differences between the main themes between Colombia and Tanzania whales: different units (Fig. 3).

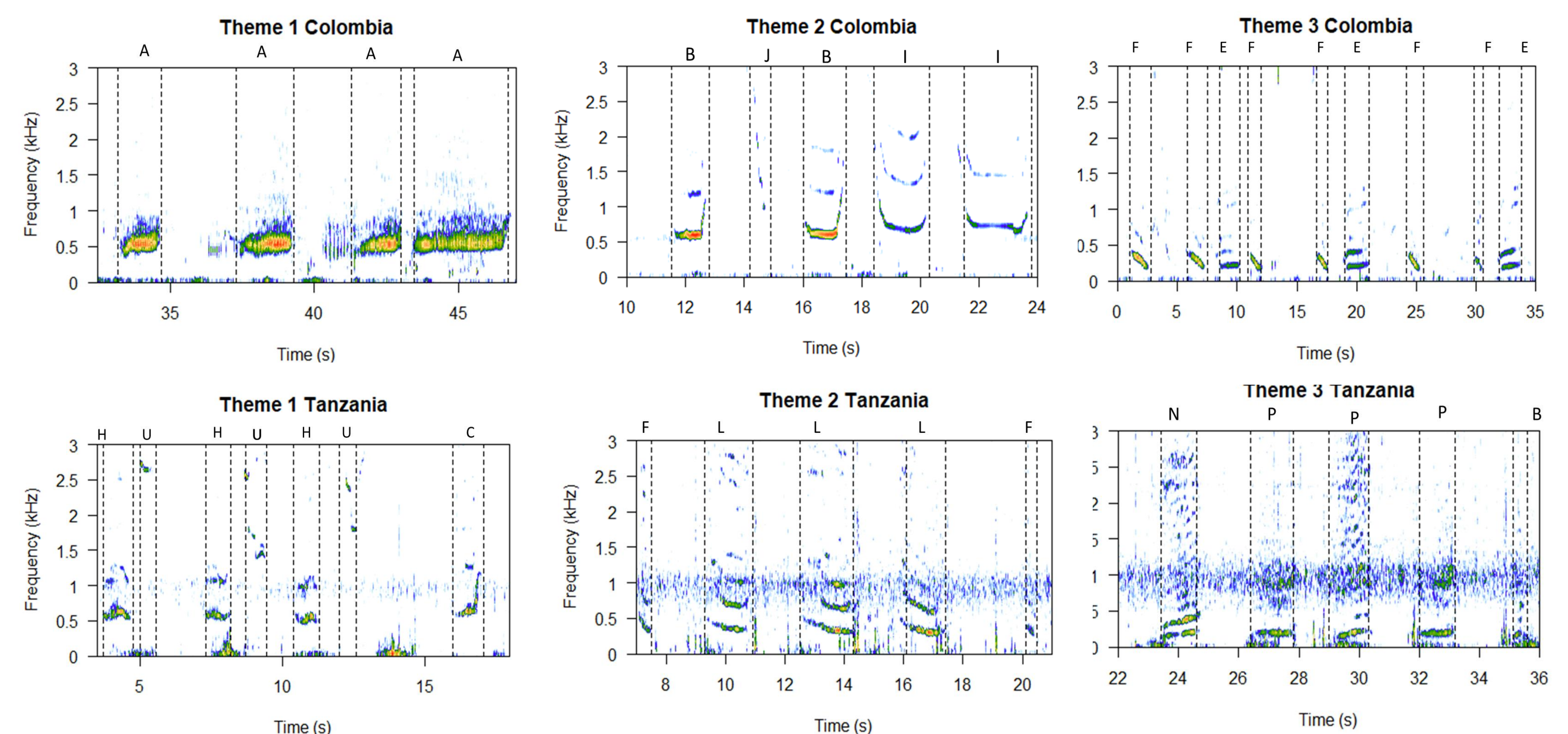


Fig.3 Humpback whale sonograms. Above: Colombian song: theme 1 was composed of unit A with differences in time duration; theme 2 by units B-I-J; and theme 3 by units F-E. Below: Tanzanian song: theme 1 was composed by units C-H-U; theme 2 by L-F; theme 3 by N-P-B.

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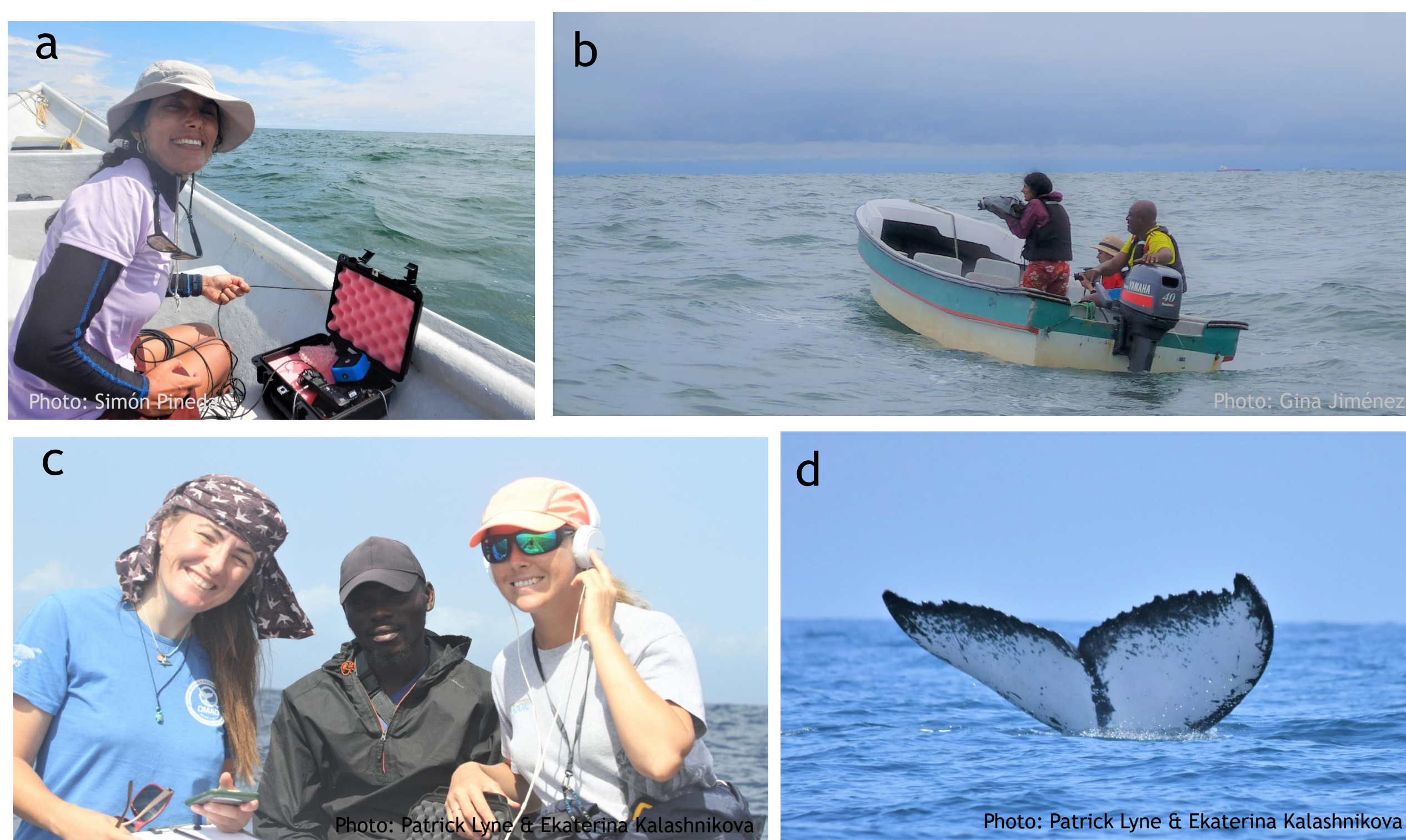


Fig.2 a-b) Collecting data in Colombia. b) Collecting data in Tanzania. d) Tanzanian humpback whale singer: "Pavarotti".

DISCUSSION & CONCLUSION

Our results show that although songs were from the same subpopulation in the same season, songs of Colombia and Tanzania differ.

However as songs sharing at the population level tends to occur between the years⁶, it is important to continue this cross boundary collaboration (data sharing and songs comparison) to prove or disprove any cultural links.

Ongoing catalogues comparison in between Tanzania and Colombia may yield results that will complement acoustic studies, and combined together may help to reveal more about population structure and migratory patterns of the South Hemispheric whales.