Using a ‘discursive ecology’ framework, we explore how policy discussions align (and even may shape) the Antarctic ecosystems.

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EXPLORING THE ECOLOGY OF THE SOUTHERN OCEAN GOVERNANCE DISCOURSE

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| BACKGROUND

Antarctica and the Southern Ocean are among the most pristine and ecologically distinct regions of our planet, harboring a singular assemblage of highly adapted and often endemic species. Standing as one of our last global commons, it is managed through a unique governance regime – the Antarctic Treaty System – built on international cooperation and bearing ecological conservation at its core.

Understanding how biodiversity has been represented and integrated into policy discussions in the region, therefore, provides precious insights into the policy-conservation nexus within an international governance framework.

| GOALS

Here, we use a “discourse ecology” framework to analyze species mentions across 60 years of policy discussions from Antarctic Treaty Consultative Meetings (ATCMs) and to evaluate the biodiversity patterns associated to them.

| METHODS OVERVIEW

Drawing on **over sixty years of official ATCMs** documentation (provided by the Secretariat for the Antarctic Treaty), we use a structured text-mining workflow (R environment) to analyze species mentions (using matches across the WoRMS - World Register of Marine Species).
We apply an ecological lens to evaluate the biodiversity patterns within the text, namely by treating each species mention as occurrences and applying classic ecological indexes to contrast input types, parties, and topics and explore longitudinal trends.

| PRELIMINARY RESULTS

Results of our ongoing efforts suggest that while the species mentioned in the ATCMs increased markedly in the late twentieth century, the **richness of the discourse has since crystalized** around a relatively **consistent set of frequently discussed species** (largely seabirds and marine mammals, with limited species-level attention to other ecologically relevant groups).

Preliminary results also show that **policy attention does not seem to align with extinction risk**, with non-threatened species receiving disproportional attention.

Notably, **discussions relating to management plans feature a high volume of species-level mentions**, and a large breadth relative to other topics, serving as an indicator of ecosystem-based management within the Antarctic Treaty System.

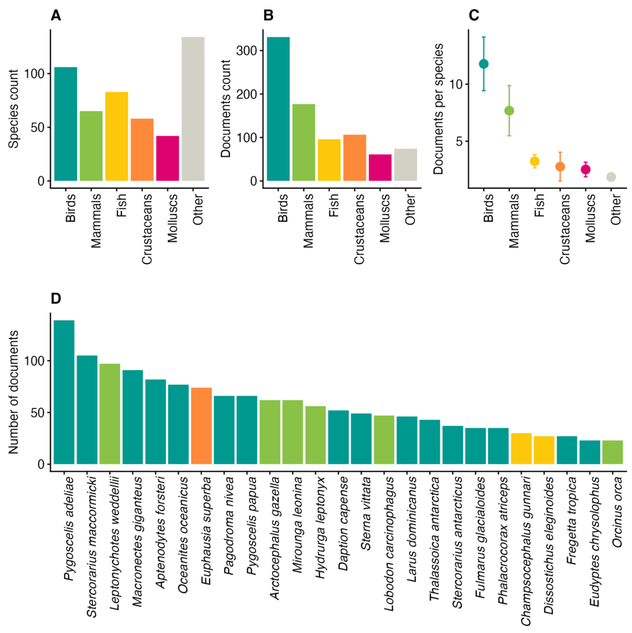

Figure 1 | **Main biological groups and species-level concentration of attention in ATCM input documents.** **(A)** Number of unique species referenced within each broad biological group. **(B)** Number of ATCM documents mentioning at least one species from each group. **(C)** Mean number of documents per species within each group (± SE), reflecting the breadth of institutional circulation of individual species. **(D)** Top 25 species, coloured according to their biological group, ranked by the number of ATCM documents in which they are mentioned.

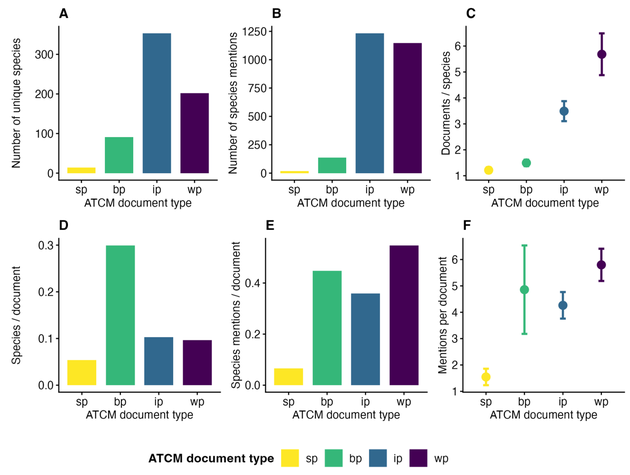

Figure 3 | **Contrasts in biodiversity attention across ATCM input document types.** **(A)** Number of unique species mentioned per document type. **(B)** Total number of species mentions per document type (unique document–species pairs). **(C)** Mean number of documents per species (± SE), capturing attention intensity at the species level. **(D)** Number of unique species per document, standardised by the total number of documents of each type. **(E)** Species mentions per document, standardised by document counts. **(F)** Mean number of species mentions per document (± SE). (SP: Secretariat Papers; BP: Background Papers; IP: Information Papers; WP: Working Papers).

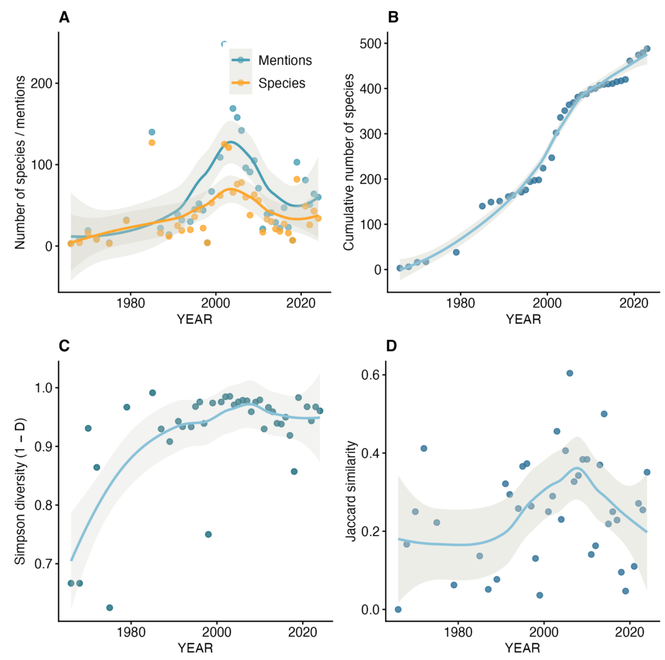

Figure 2 | **Temporal dynamics of biodiversity attention in ATCM input documents.** **(A)** Annual volume of documents referencing at least one species (blue) and the number of distinct species referenced (orange). **(B)** Cumulative number of distinct species entering ATCM discourse over time, based on the first year in which each species was mentioned. **(C)** Simpson diversity applied to species mentions per year, computed from the distribution of document mentions among species (lower values indicate concentration on a few species; higher values indicate more even distribution of attention). **(D)** Year-to-year Jaccard similarity in species composition, measuring the overlap in species referenced between consecutive years and serving as a proxy for discursive turnover (higher values indicate greater continuity; lower values indicate greater turnover).

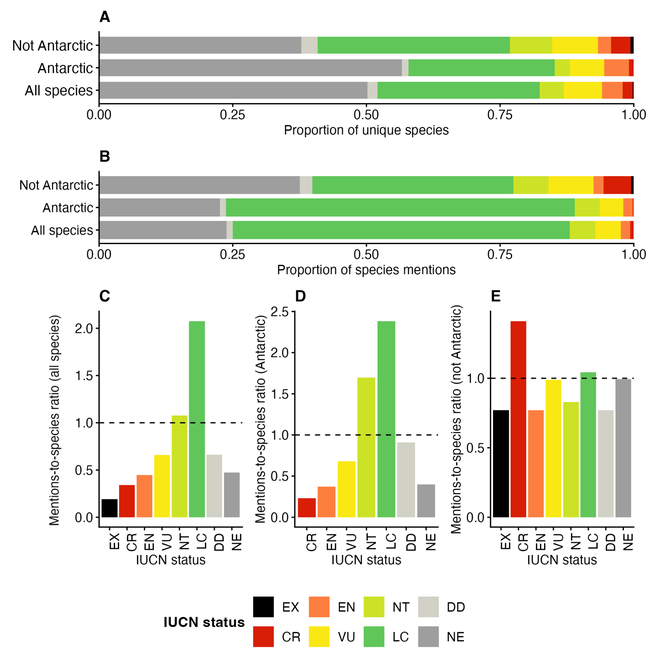

Figure 4 | **Representation and bias across IUCN Red List categories in Antarctic Treaty Consultative Meeting (ATCM) discourse.** Proportional composition of unique species **(A)** and of distinct species mentions (document–species co-occurrences) **(B)** for all species mentioned in ATCM documents by IUCN Red List status. **(C–E)** Mentions-to-species ratios for each IUCN category. Ratios are calculated as the proportion of all mentions divided by the proportion of unique species within each category; values > 1 (dashed line) indicate disproportionate policy attention relative to species richness, whereas values < 1 indicate under-representation. (EX: Extinct; CR: Critically Endangered; EN: Endangered; VU: Vulnerable; NT: Near Threatened; LC: Least Concern; DD: Data Deficient; NE: Not Evaluated).

| TAKE-AWAY MESSAGE

By **using an Ecology lens** to explore the ATCM documents highlights how **policy discussions both reflect and shape the management of the underlying ecosystem**, with **lessons that should extend beyond the Southern Ocean** and into **conservation-forward governance** more broadly.

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