

MOVECLIM

MONTANE VEGETATION AS LISTENING POSTS FOR CLIMATE CHANGE

Objective

Beside their striking diversity, islands host a particular and restricted endemic flora. High mountains hosts in many islands the best remnant native vegetation fragments allowing comparisons and studying the driving factors affecting the environment – climatic, land-use, implementation of conservation areas, etc.

Using a standardized methodology, MoveClim aims at making macro ecological comparisons of spore dispersing plants (ferns and bryophytes, thermally specialized to these environment) between islands-sites in order to:

(1) Characterize the diversity of poorly known but species rich groups of plants (2) Elucidate the processes which govern species richness and its distribution along elevational transects and relate these to life history and functional traits of species (3) Link richness patterns to environmental and spatial predictors (4) Model the shift of species range with climatic scenarios (5) Establish permanent plots for long-term monitoring, managing responses for vegetation and raising directions for decision-making.

Main outputs

- 14 species newly recorded bryophytes for some islands, 1 new species and a new genus of bryophytes for Science were reported in the project,
- **23** articles scientifiques dont 3 en commun entre les partenaires du projet, **17** communications en conférence, **3** articles et **3** conférences de vulgarisation scientifique, **3** reportages TV, **2** documentaires (France O, 2015), **1** blog actif de 22748 vues,
- The key role of bryophytes in insular ecosystems services was quantified. In a tropical cloud forest of Reunion Island, the biomass of bryophytes recorded accounts for 34560 l.ha⁻¹ of water intercepted,
- For the regional endemic species of moss *Sphagnum tumidulum*, the analysis of genetic variation and population differentiation suggests sexual reproduction on Réunion island,
- The study contributed to the understanding of the spatial organization of bryophyte diversity at multiple scales and the roles of spatial organization, climate and vegetation in shaping the natural diversity. A new pattern of species richness (double peak) along the elevational gradient was discovered with ground-dwelling communities of bryophytes along the Piton des Neiges gradient (Réunion, Mascarenes).
- The identification of elevational ranges of species enabled the modelling of future distribution. First species distribution modelling study under climate change scenarios was done for ferns of Tahiti (French Polynesia)
- Production of new collaborative tools (standardized methodology, manuals for production of standardized data, common R scripts, long term monitoring plots...).
- The investigation of bryophyte functional diversity brought useful results for conservation purposes, e.g. ground-dwelling bryophytes may be more robust than epiphytic bryophytes to disturbances in subalpine ecosystems.
- Young researcher's & capacity building – 5 PhD candidates, 5 Master 1 students, 4 Master 2 students and 3 honours students

Web : <http://moveclim.blogspot.com/>

Approaches

The 11 partners of 6 countries and five small islands (Réunion Island (Mascarenes), Pico (Azores), La Palma (Canarias), Guadeloupe (West Indies) and Tahiti (French Polynesia)) did the first global scale and multi island biogeographic analysis for bryophytes and ferns using:

- A standardized methodology for collecting bryophytes and fern along elevational gradients of the 5 islands
- Climatic sensors every 200 m along these high mountains to record temperature and relative humidity hourly
- *In situ* experiments with a novel method (lysimeters) to estimate the role of cloud water in bryophyte water interception



11 partners



UMR PVBMT Université de La Réunion - Reunion Island (Fr) / Parc National de Guadeloupe – Guadeloupe (Fr) / Universidade dos Açores, Azores (Pt) / University of La Laguna, Canaria Islands (Sp) / Parc National de La Réunion – Reunion Island (Fr) / Conservatoire Botanique de Guadeloupe – Guadeloupe (Fr) / Délégation à la Recherche & ONG Te Rau Ati Ati A Tau A Hiti Noa - French Polynesia (Fr) / Muséum National d’Histoire Naturelle, France / University of Cape Town, South of Zürich, Switzerland / University of Marburg, Germany
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Picture:



Piton des Neiges (Réunion)

permanent plots

ferns



Bains Jaunes forest primary rain forest Guadeloupe



La Palma (Canaries)

islands

Montane vegetation as listening posts for climate change

biodiversity



Town's view of Papeete from ridge Mt Aorai, Tahiti

hotspot

climate change



Pico (Azores)

cloud forests

bryophytes