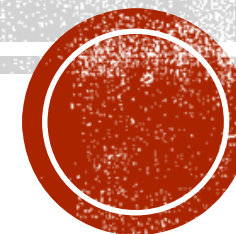


**Esther Githumbi<sup>1,2</sup>, Marie-Jose Gaillard<sup>1</sup>, Anne-Marie Lézine<sup>3</sup>, G. Achoundong<sup>4</sup>, C. Hély<sup>5</sup>, J. Lebamba<sup>6</sup>, L. Marquer<sup>7,8</sup>, F. Mazier<sup>8</sup>, S. Sugita<sup>9</sup>**

# QUANTITATIVE LAND-COVER CHANGE IN WEST AFRICA OVER THE HOLOCENE: CASE STUDY CAMEROON



**1** Linnaeus University, Sweden

**2** Lund University, Sweden

**3** Laboratoire d'Océanographie et du Climat, Expérimentation et Approche Numérique/IPSL, Sorbonne Université, CNRS-IRD-MNH, Paris, France

**4** National Herbarium, IRAD, Yaoundé, Cameroon

**5** Institut des Sciences de l'Évolution de Montpellier, Université de Montpellier, France

**6** Département de Biologie, Université des Sciences et Techniques de Masuku, Franceville, Gabon

**7** Research Group for Terrestrial Palaeoclimates, Max Planck Institute for Chemistry, Mainz, Germany

**8** GEODE, UMR-CNRS 5602, Labex DRIHM (OHM Pyrénées Haut Vicdessos), Université Toulouse Jean Jaurès, France

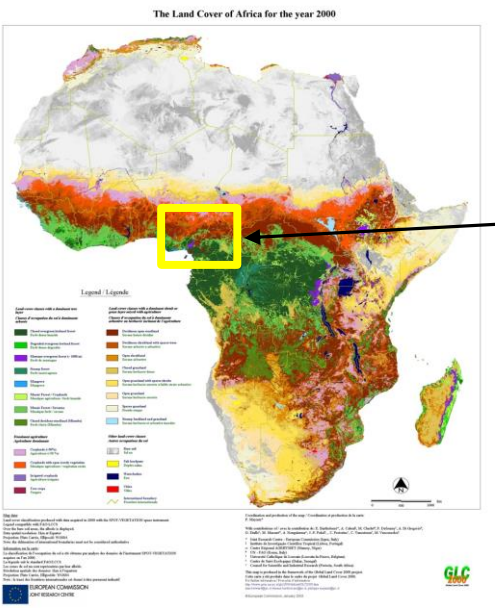
**9** Institute of Ecology, Tallinn University, Estonia



# GOAL

- Using the ERV and LRA models produce pollen productivity estimates for African taxa then reconstruct quantitative pollen based land cover for the Holocene period at local and regional scale.





**Cameroon ~350 km W-E x 500 km S-N**



★ **Tilla**

*Sudanian Wooded Grassland/Grassland*

*Sudanian Dry Forest/Wooded Grassland*

**Tizong** ★ **Mbalang**

**Bambili** ★ **Mbi**

**Monoun**

**Gulf of Guinea**

*Guineo-Congolian (secondary) Forest/Savanna mosaic*

*Guineo-Congolian Rain and Semi-deciduous Forest*

● **Modern Pollen samples**

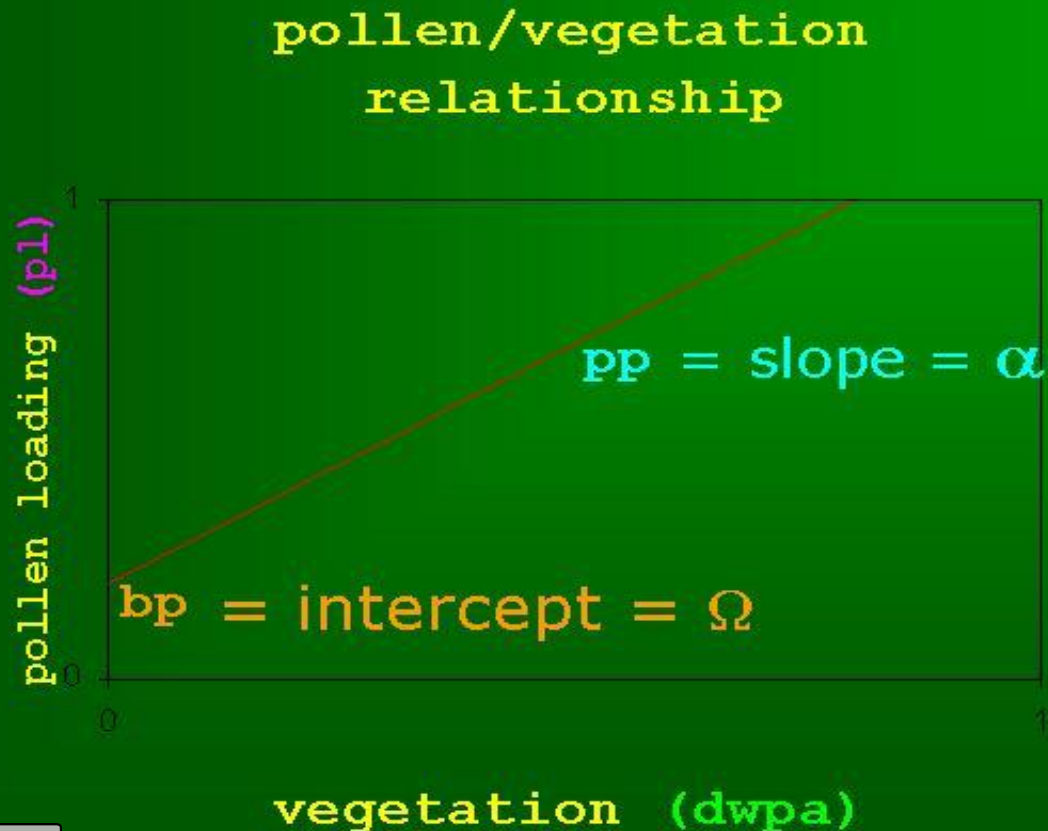
★ **Late quaternary sequences**

BIOME	NAME	SIZE (ha)	TYPE
Savanna/wooded grassland	Tilla	46.7	Lake
Savanna/wooded grassland	Mbalang	25	Lake
Savanna/wooded grassland	Tizong	8	Lake
Afromontane Forest	Mbi	198	Bog
Afromontane Forest	Bambili	16.5	Lake



1. Pollen productivity estimation using the Extended R Value model (ERV model) developed by Prentice and Parson, and extended/automated (simplified) by Shinya Sugita.

- Collect pollen and vegetation data at increasing distances then apply the ERV model.



**Extended RValue (ERV models):**

$$pl = (dwpa \times pp) + bp$$

pl = pollen loading

dwpa = distance weighted plant abundance

pp = pollen productivity

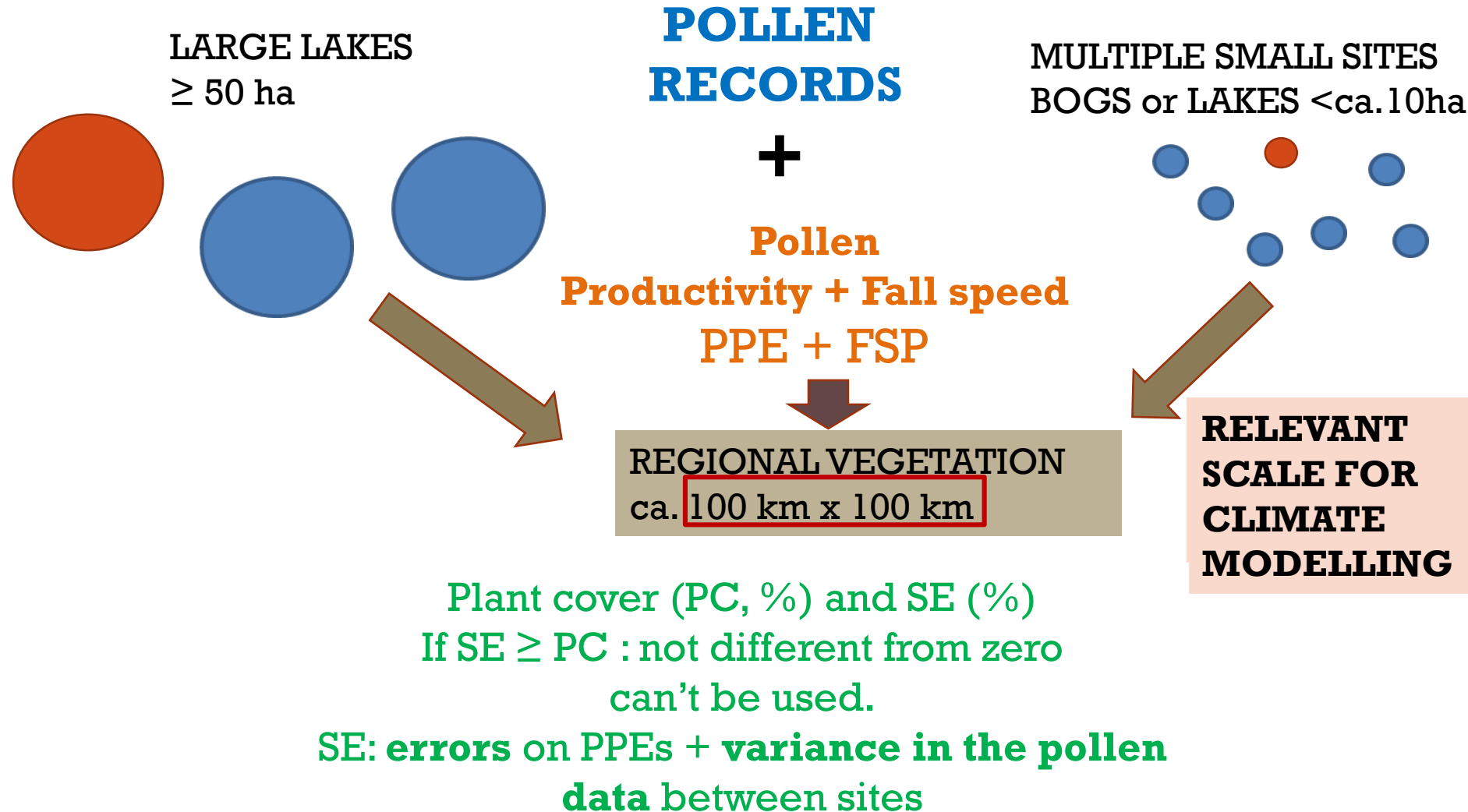
bp = background pollen

**RESULTS:**

PPE estimates for 13 taxa:

Podocarpus <, Hymenocardia <, Prunus africana-type/Rubus pinnatus-type <, Cyperaceae undiff <, Moraceae undiff <, Combretaceae/Melastomataceae <, Poaceae undiff = 1, Nuxia-type congesta >, Macaranga-type >, Schefflera >, Syzygium >, Alchornea >, Celtis >.

## 2. THE REVEALS MODEL (Sugita 2007a, The Holocene)



The REVEALS model has been validated in Europe and Northern America and is currently being validated in temperate China and Southern India and Cameroon (this study).



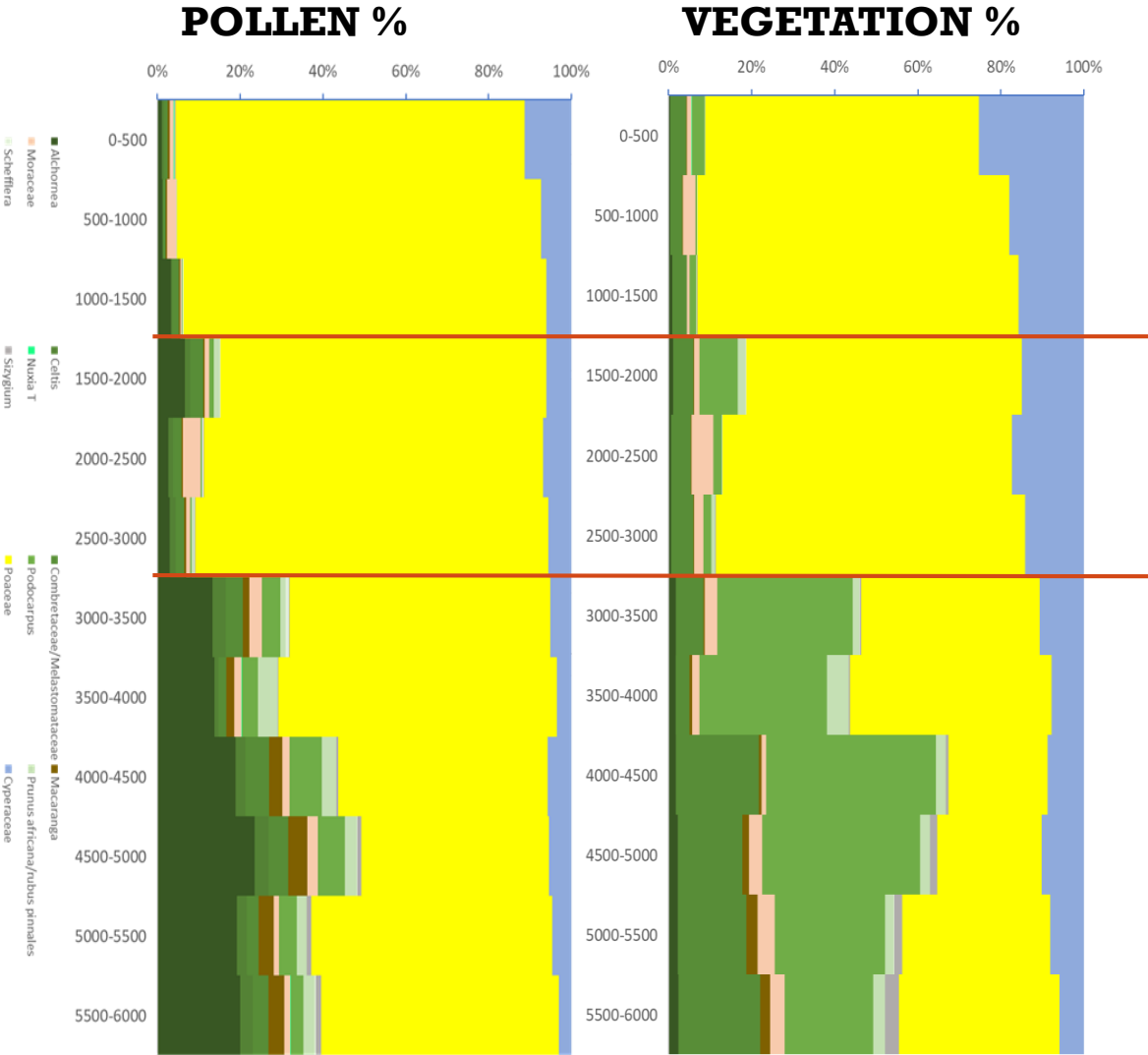
## Expected results:

Quantitative pollen-based land cover reconstructions that can be used to improve our understanding of the pollen-vegetation relationships, vegetation dynamics through time, drivers of land cover and land use hypothesis e.g. from a preliminary run of the models on the savannah sites

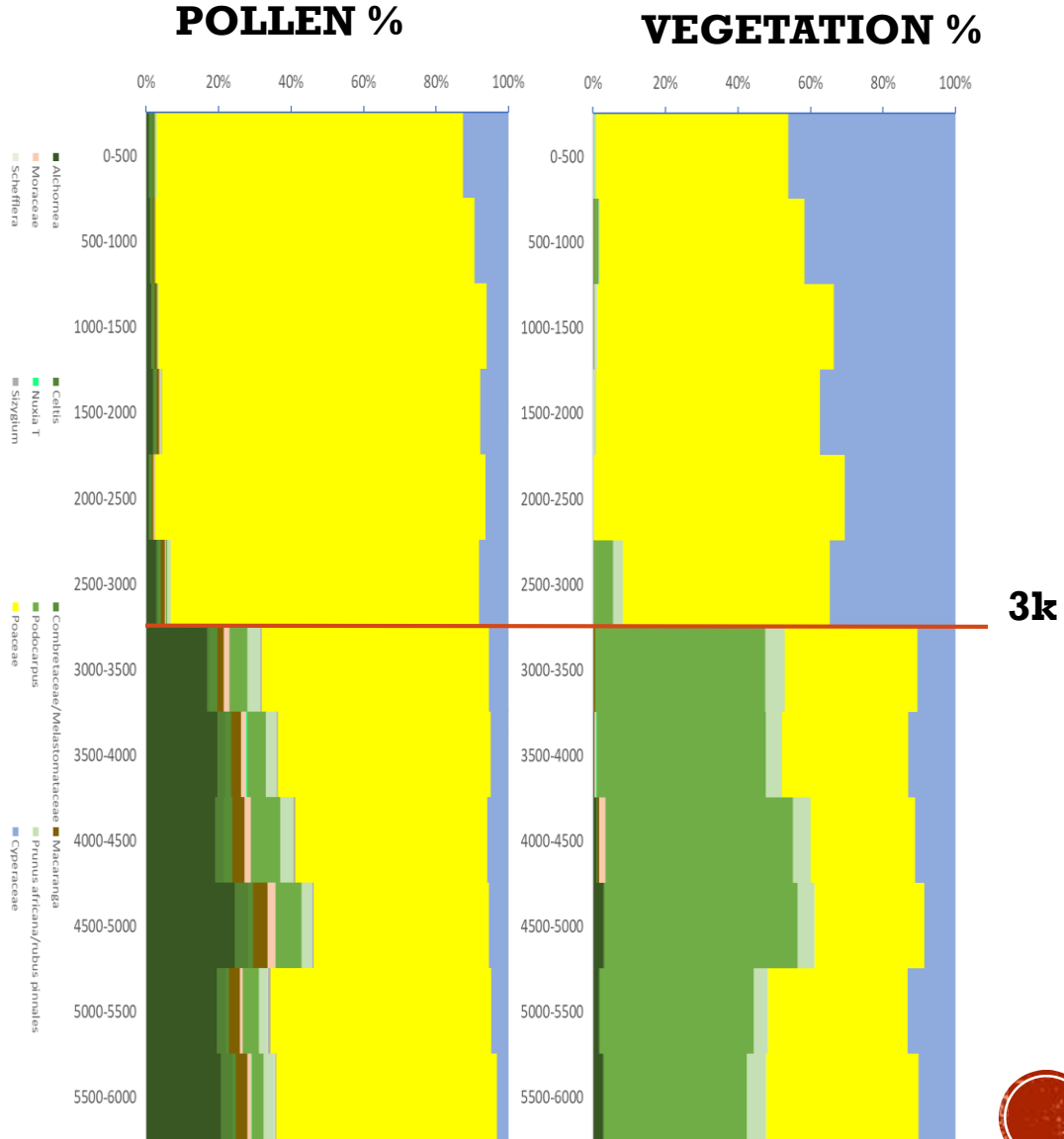
1. A comparison of both the REVEALS and LOVE outputs shows a difference in the relative contribution of different taxon in the overall vegetation change through time compared to the pollen record.
2. There are significant changes in dominant taxa 3000 and 1000 cal bp in both the pollen record and the vegetation reconstruction.



# Regional plant cover (REVEALS) 100 x 100 km – Tilla, Tizong and Mbalang



# Local plant cover (LOVE)–RSAP 2km from Mbalang



Preliminary model runs: Laurent Marquer



# FUTURE WORK

- To develop robust and reliable past land cover estimates then further work is needed in a cyclical format.

