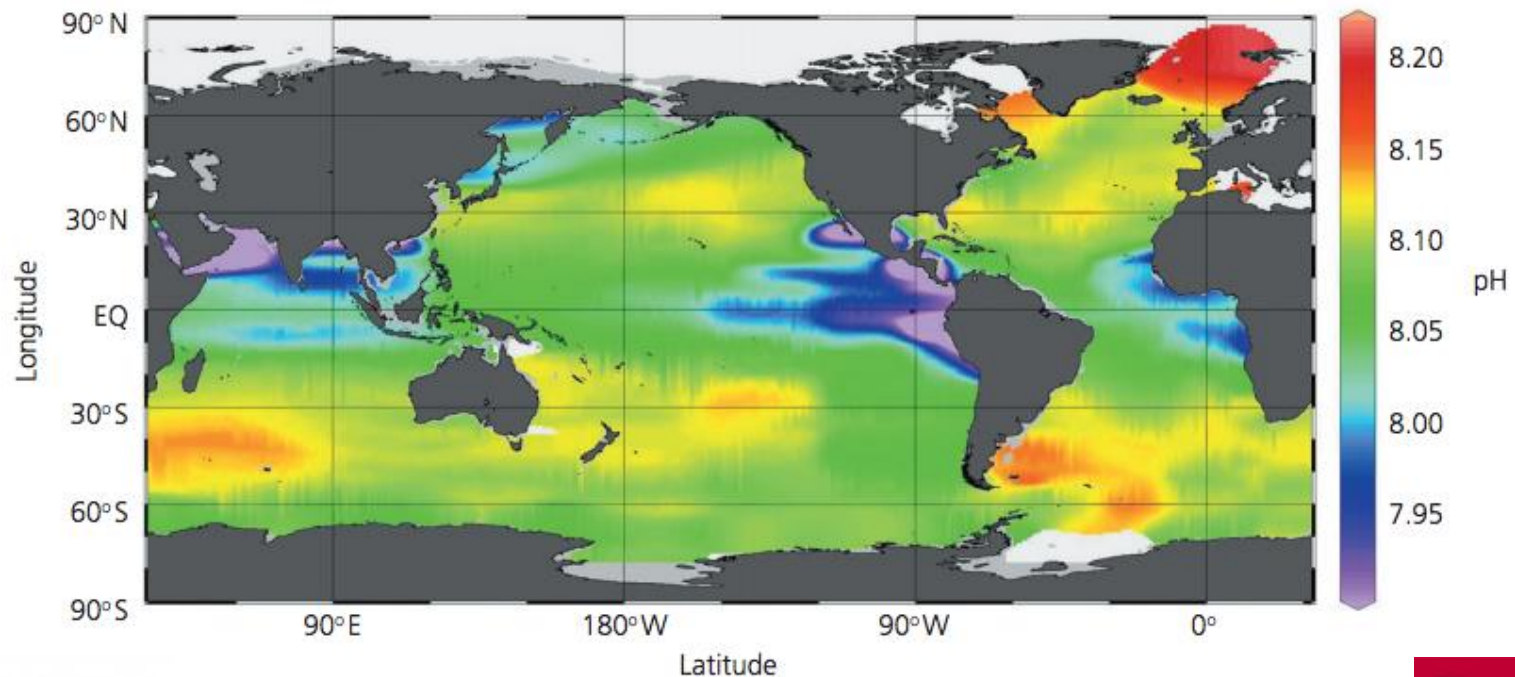


# Earth System modeling and geospatial information

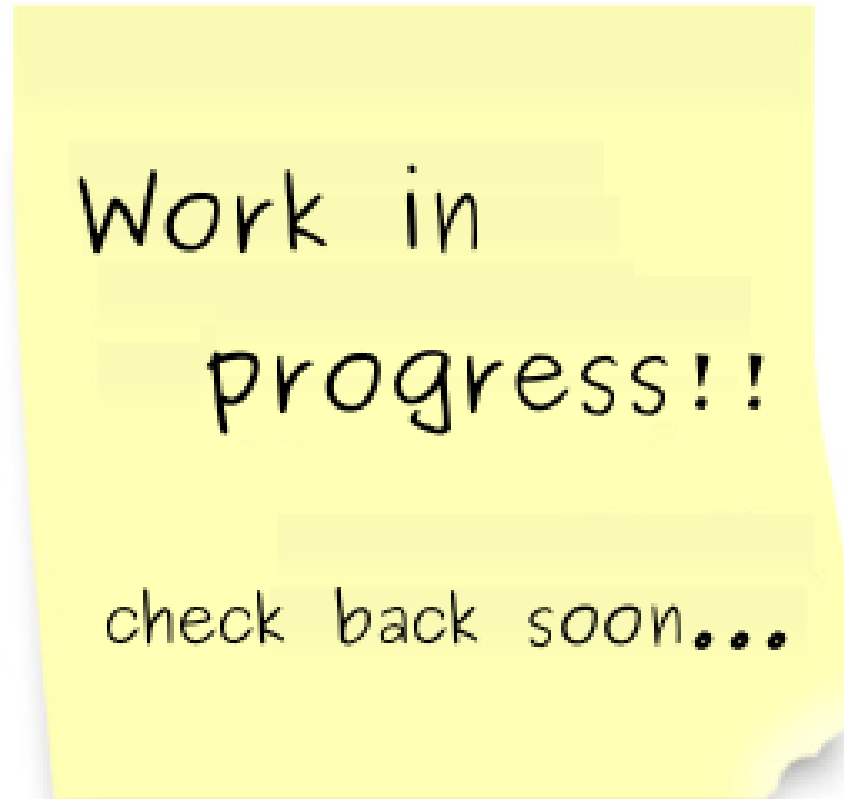
Alvaro Montenegro  
Geography – OSU



Climate change  
parameter rar

na at pertinent  
temperature and

Tânia Marcia Costa &  
Alvaro Montenegro -



*Uca victoriana*

Image:Ricardo Samelo

# Afforestation with the Canadian Earth System Model

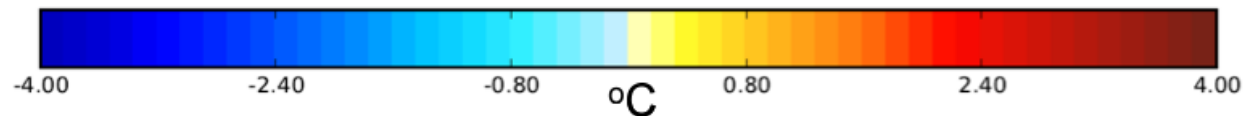
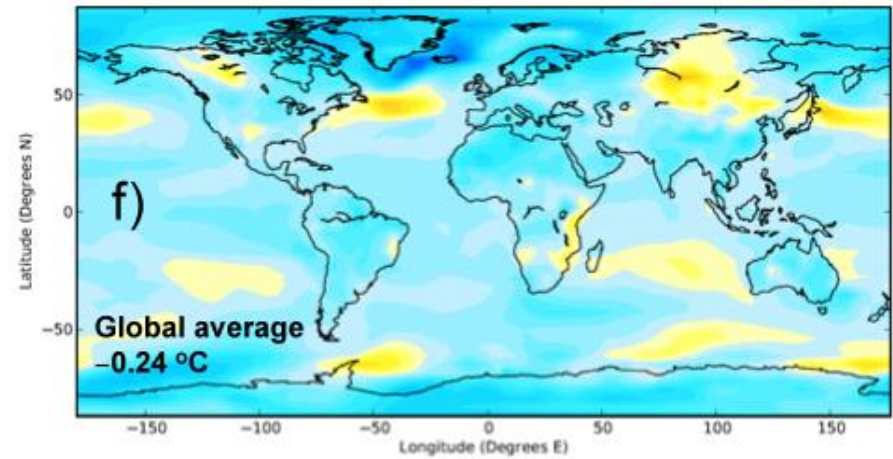
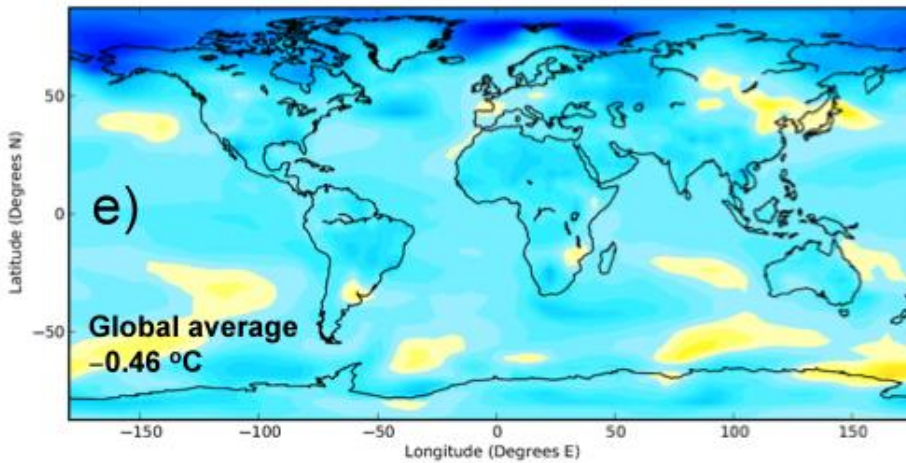


## Results

100% afforestation

50% afforestation

Biogeochemical component of the temperature change



# Reproductive pattern comparison of *Uca thayeri* Rathbun, 1900 and *U. uruguayensis* Nobili, 1901 (Crustacea, Decapoda, Ocypodidae)

Tânia Marcia Costa<sup>1\*</sup>, Stella Maris Januário Silva<sup>2</sup> and Maria Lucia Negreiros-Fransozo<sup>2</sup>

<sup>1</sup>UNESP; Campus do Litoral Paulista; Unidade de São Vicente; Praça Infante Dom Henrique, s/n; costatm@csv.unesp.br; 11300-900; São Vicente - SP - Brasil. <sup>2</sup>Departamento de Zoologia; IBB/UNESP, s/n; 18618-000; Botucatu - SP - Brasil

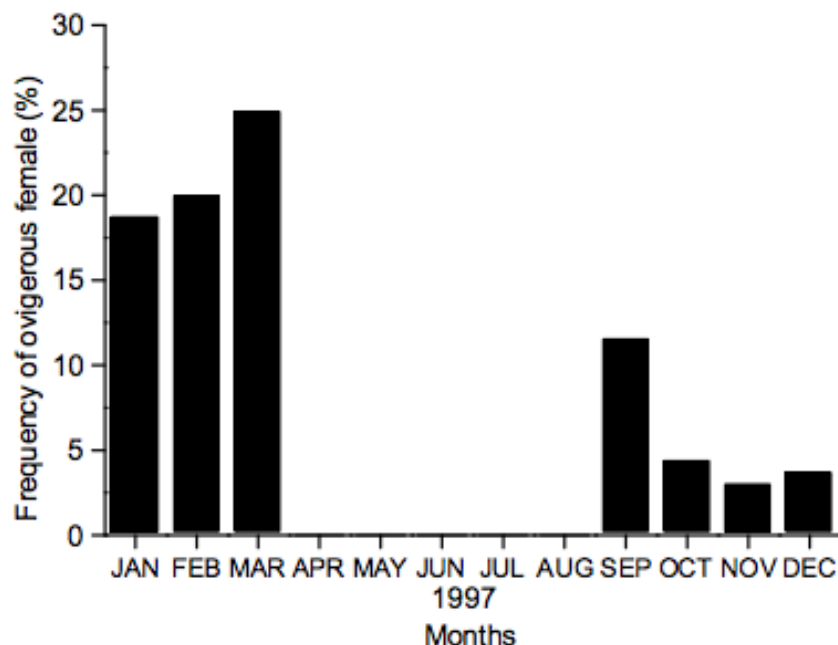


Figure 3 - *Uca thayeri* Rathbun, 1900. Temporal variation of the frequency of ovigerous females.



**Back in 2009...**





**Aquecimento global e acidificação oceânica: efeitos da temperatura, salinidade e dióxido de carbono no desenvolvimento larval do caranguejo intertidal *Eriphia gonagra***

Eduardo Bolla's PhD



**Four year visiting professor position between 2013-2016 at Unesp S. Vicente**

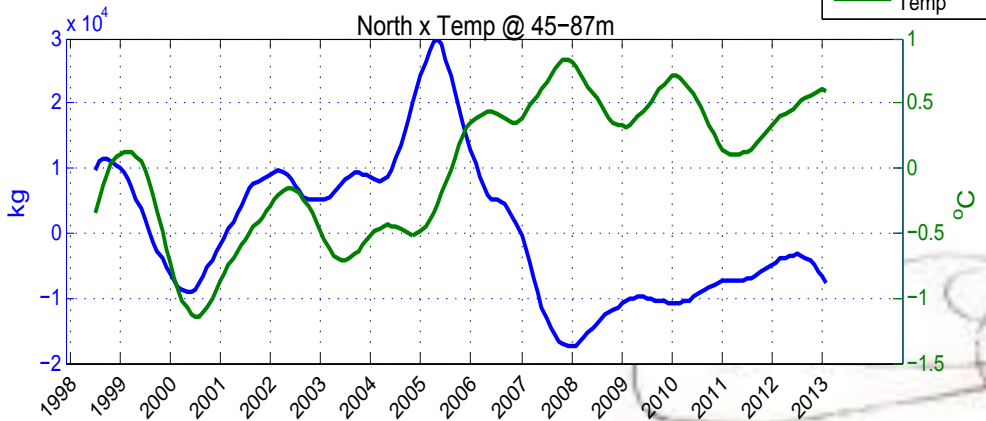
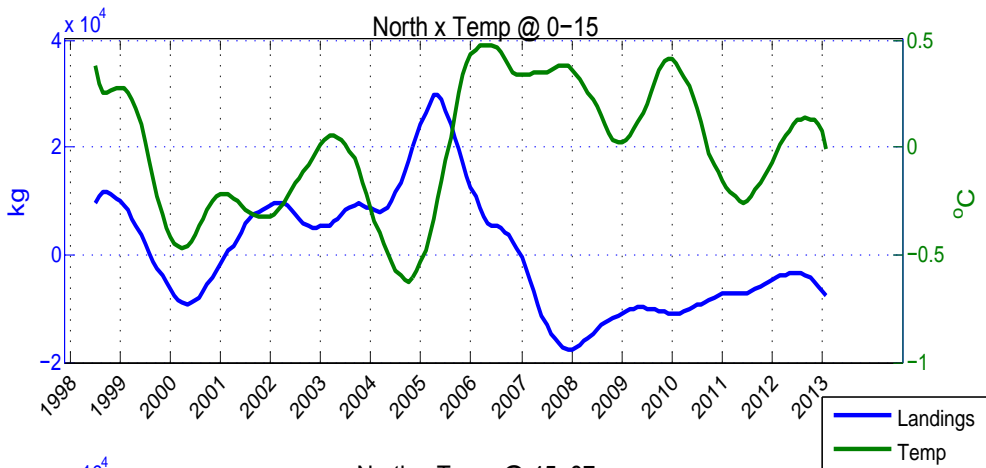


**Climate change and fisheries: projections for the exploitable stocks of the shrimps *Xiphopenaeus kroyeri* and *Pleoticus muelleri* for São Paulo's northern coast**

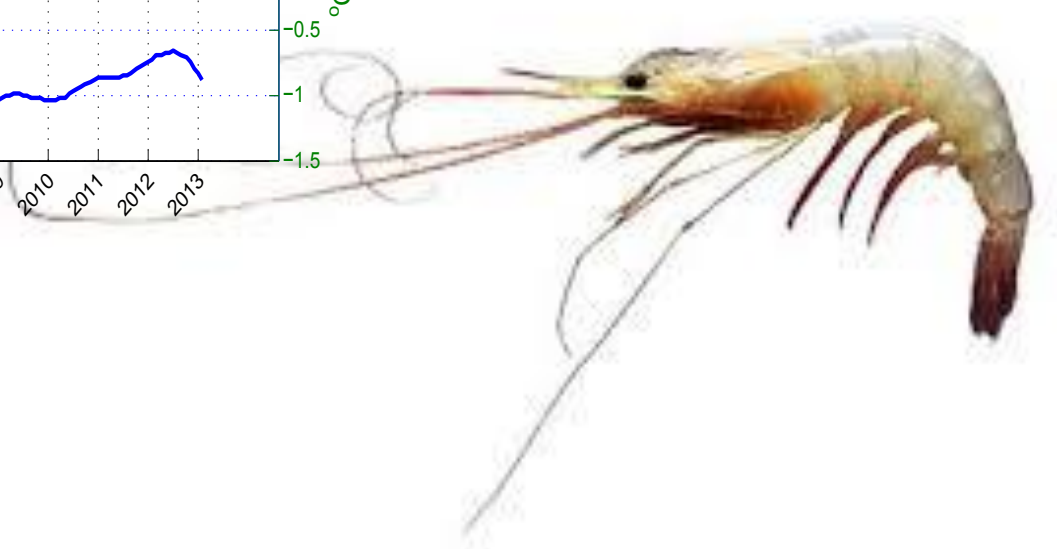
Eduardo Bola's 2014 postdoc project in parallel to OSU-FAPESP's mobility grant







And Eduardo gets a real job and drops the postdoc...



Tânia and I regrouped and developed a new project with components that pushes both of us into areas we had been interested in but were out of our comfort zones..



### Large scale predictors



$\left. \begin{array}{l} (Z(1000 \text{ mb}), \dots, Z(500 \text{ mb}); \\ T(1000 \text{ mb}), \dots, T(500 \text{ mb}); \\ Q(1000 \text{ mb}), \dots, Q(500 \text{ mb})) \end{array} \right\} X_n$

### Downscaling Model

Analogs, reg., ...  
 $Y_n = f(X_n)$

Statistical methods based on historical data to link large scale circulation to local climates.

### Local predictands



$Y_n$  Surface Variables:  
**Precipitation**  
**Temperature**

# The FAPESP-OSU grants have:

- Strengthened the links between Unesp and OSU
  - Unesp PhD student coming to OSU on a sandwich fellowship in 2017
  - OSU graduate student (maybe from Brazil) working on the downscaling going to Brazil in 2017-18
- Provided me with an important lesson in how to develop productive, non-orthodox collaborations with great potential for generating results with both scientific and societal significance.