Environment and Health

• • •

Integrative Approach

Emmanuel ROUX

• • •

Colloque HYBAM, Manaus
19-21/11/2007

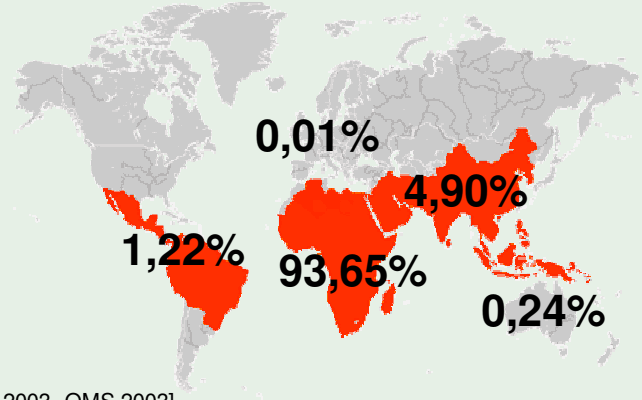
Plan

Plan

Societal Issues

Public health

1.5 to 2.7 M of deaths / year
Third cause of mortality of children under 5 years old



[Sipe & Dale 2003, OMS 2003]

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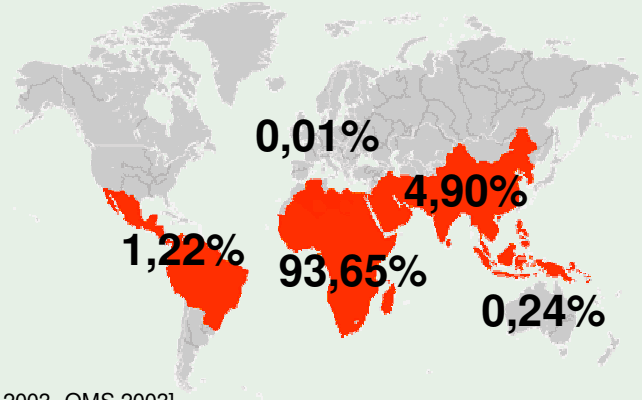

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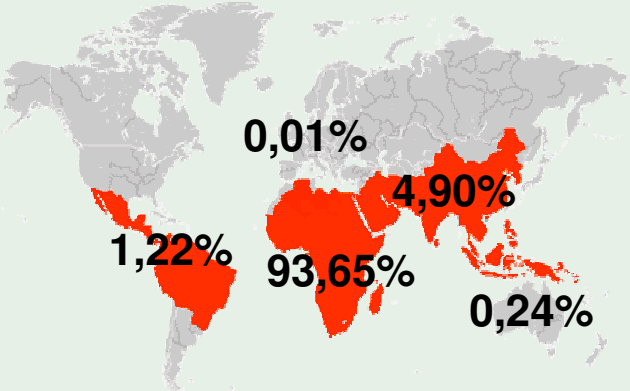

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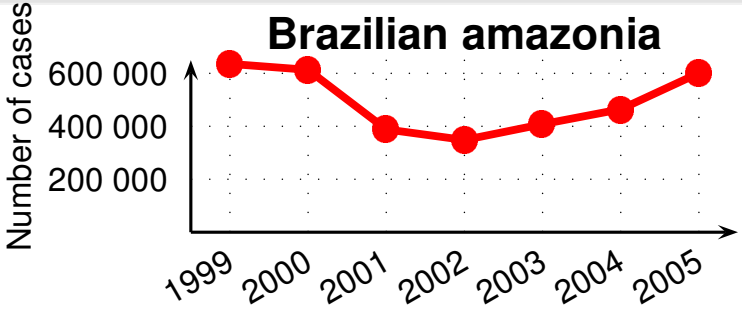

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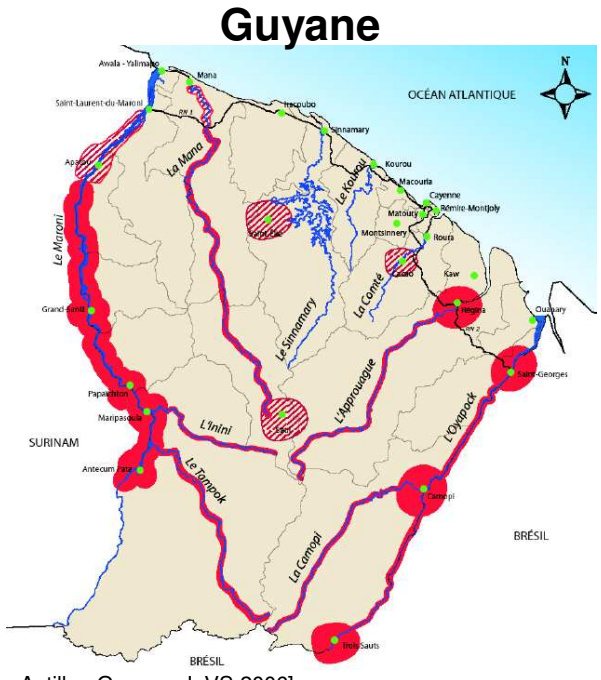

[DSDS, Cire Antilles-Guyane, InVS 2006]

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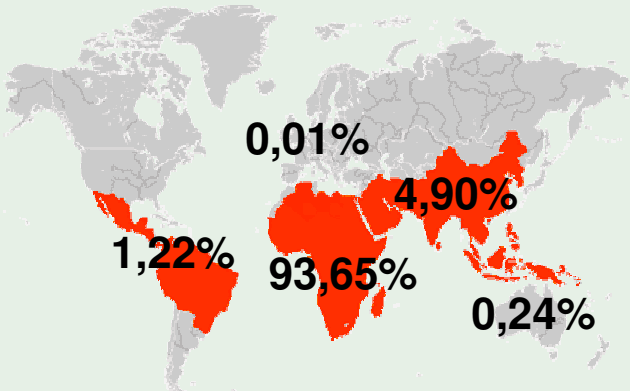

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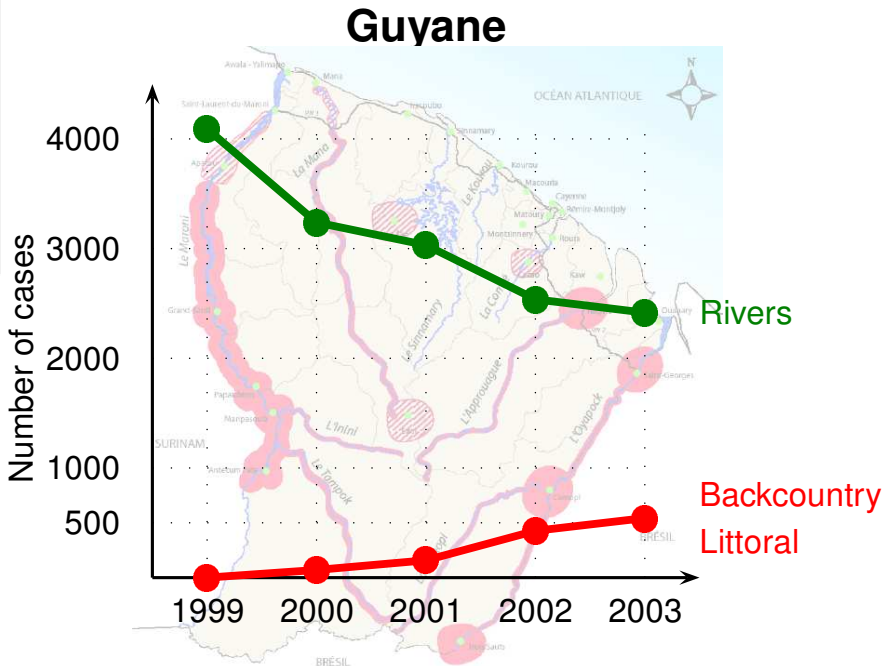

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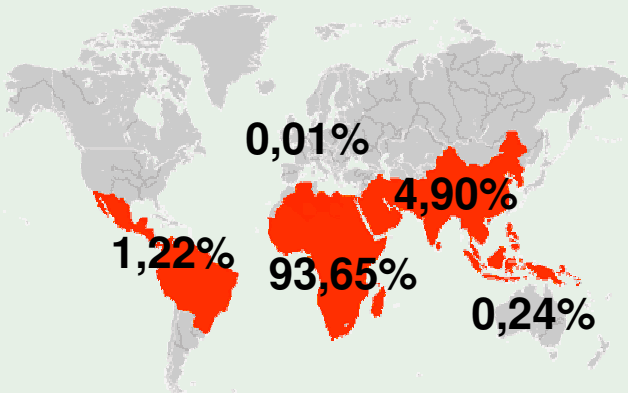


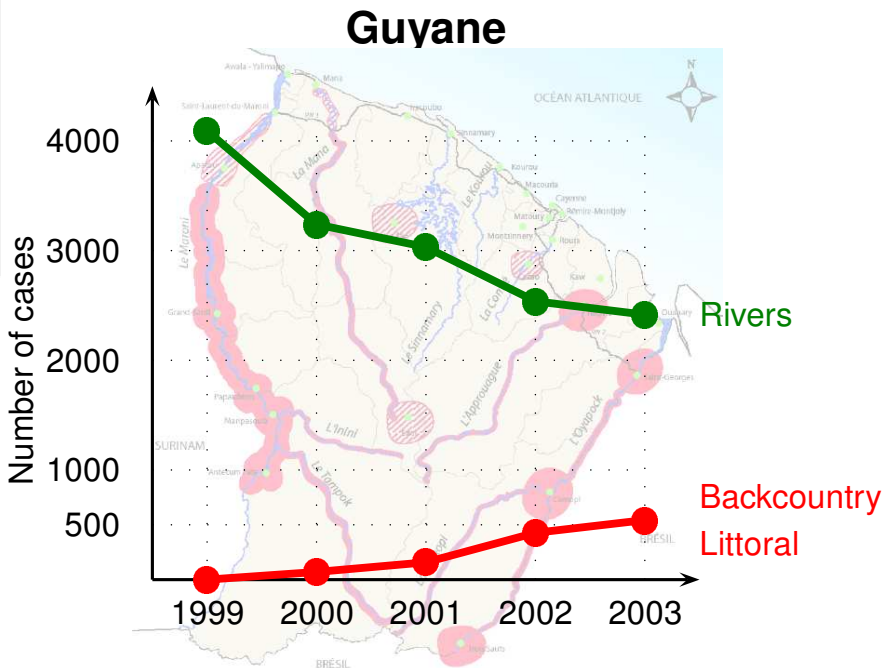
[Sipe & Dale 2003, OMS 2003]

Development

- ↘ 70% of the GDP / inhabitant
- Development slowed down by 1.3% / year

[Noel 2003]

[Ministério da Saúde 2006]



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Objectives and Stakes

Objectives

1. Describing **interactions between**
   - **environmental,**
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   - **socio-medical,**
   - **socio-demographic factors**

   that control the **emergence** and the **dynamics of the epidemics**

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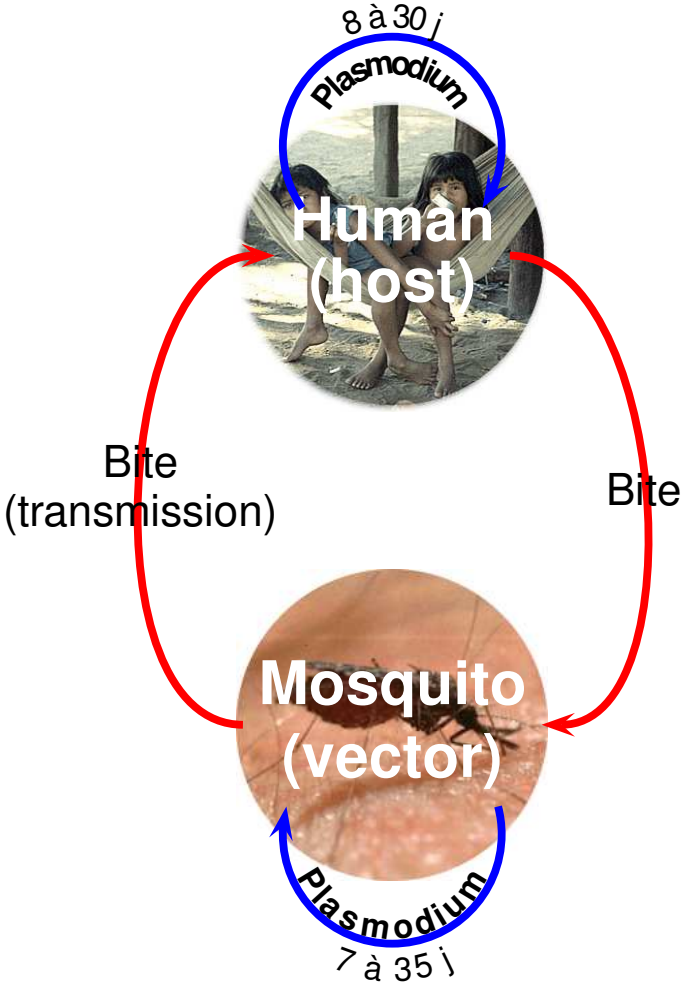
Stakes

Better understanding the emergence and transmission modes

$\rightarrow$ Decision support (public health, land settlement)

Scientific Issues



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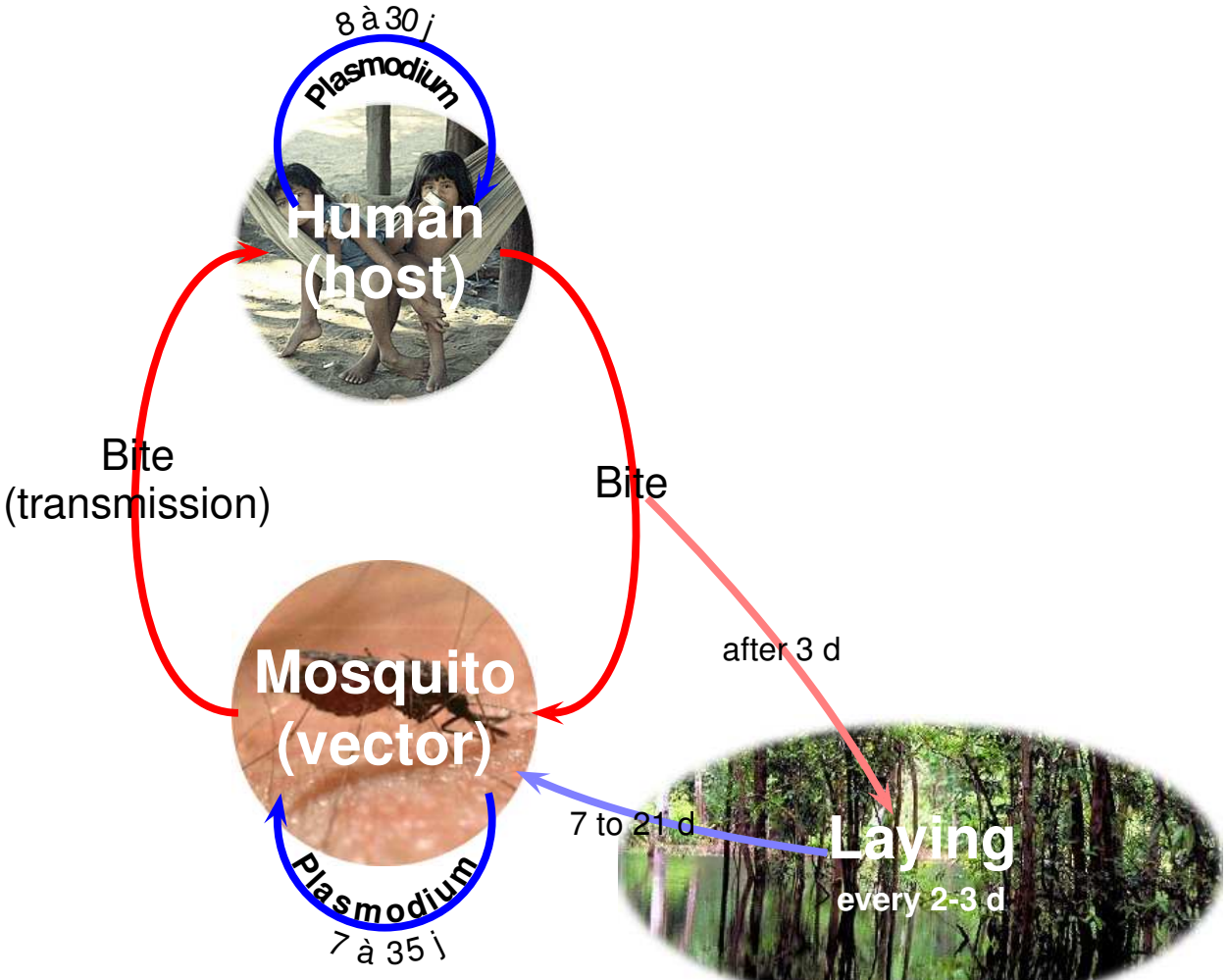

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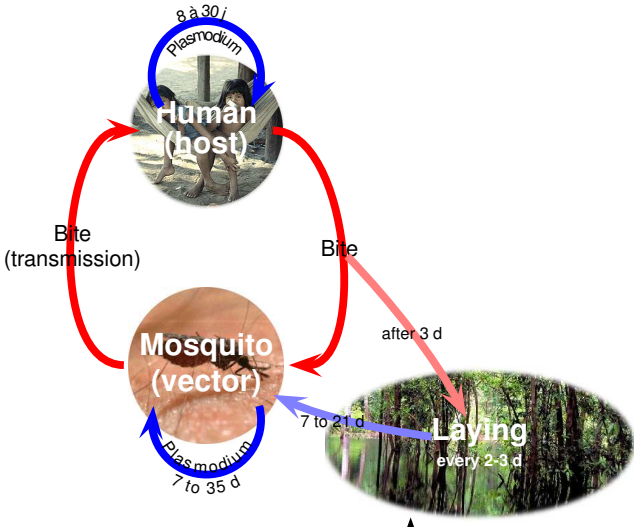

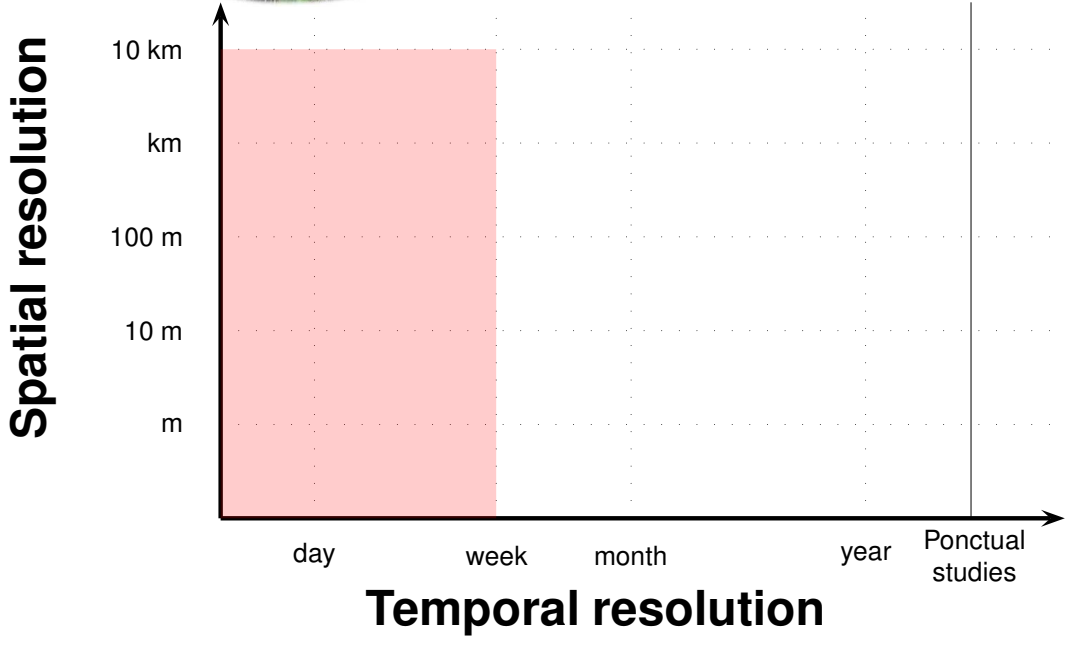

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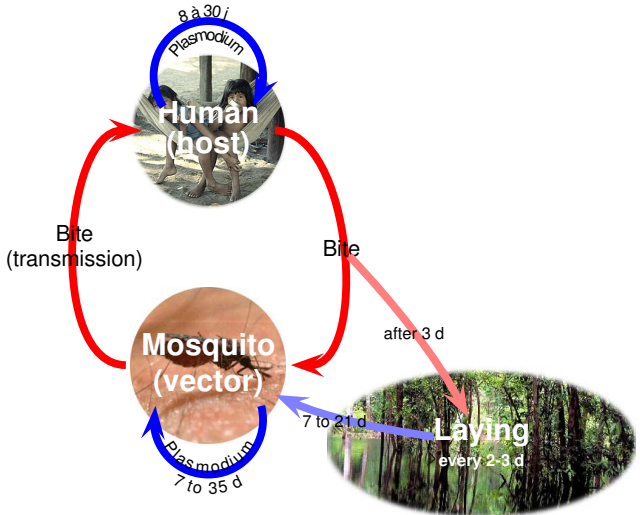

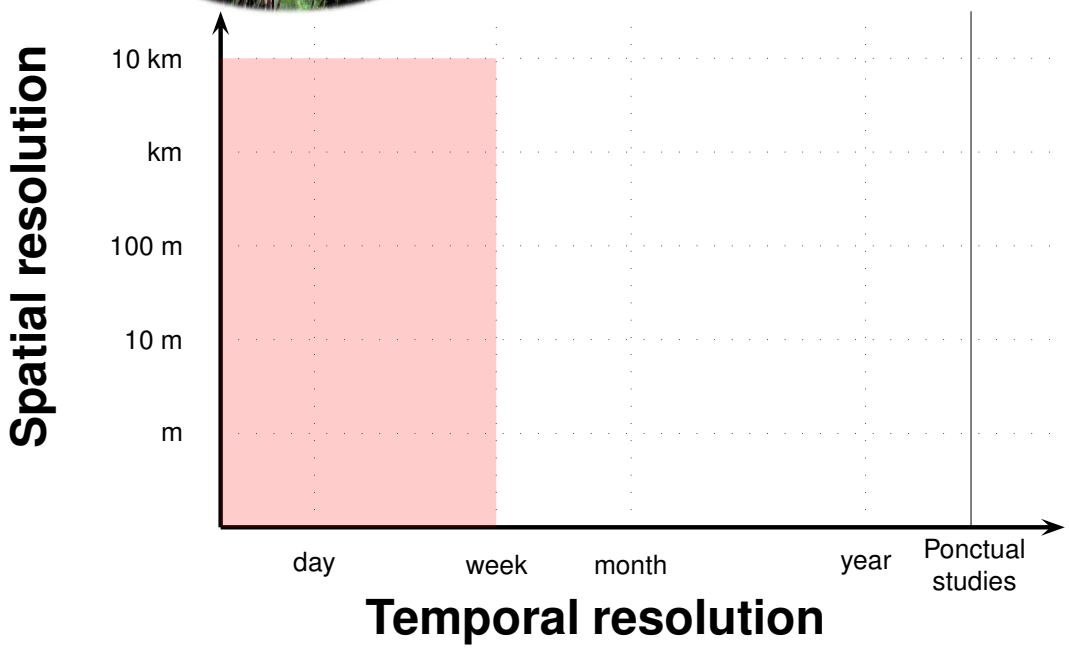

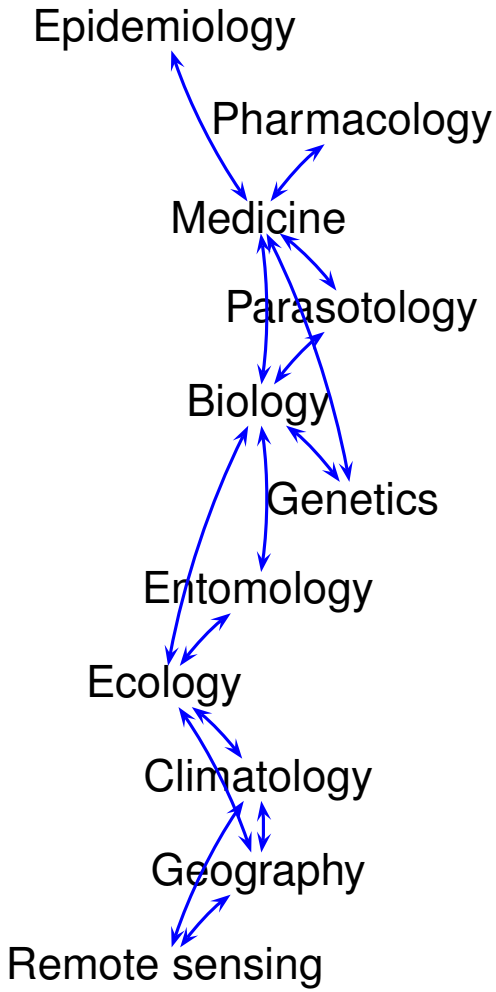

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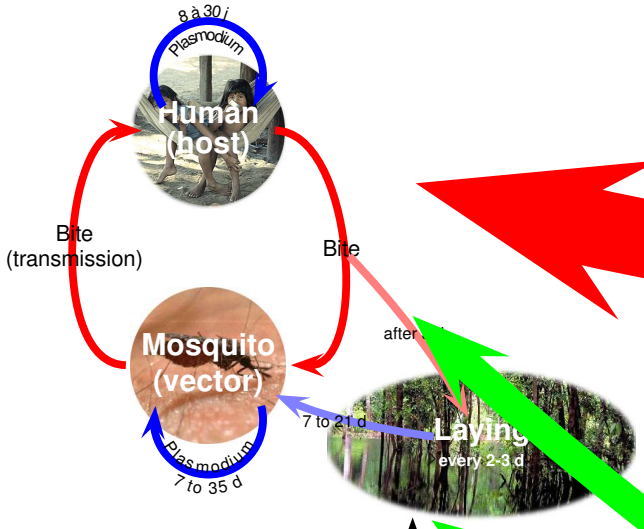

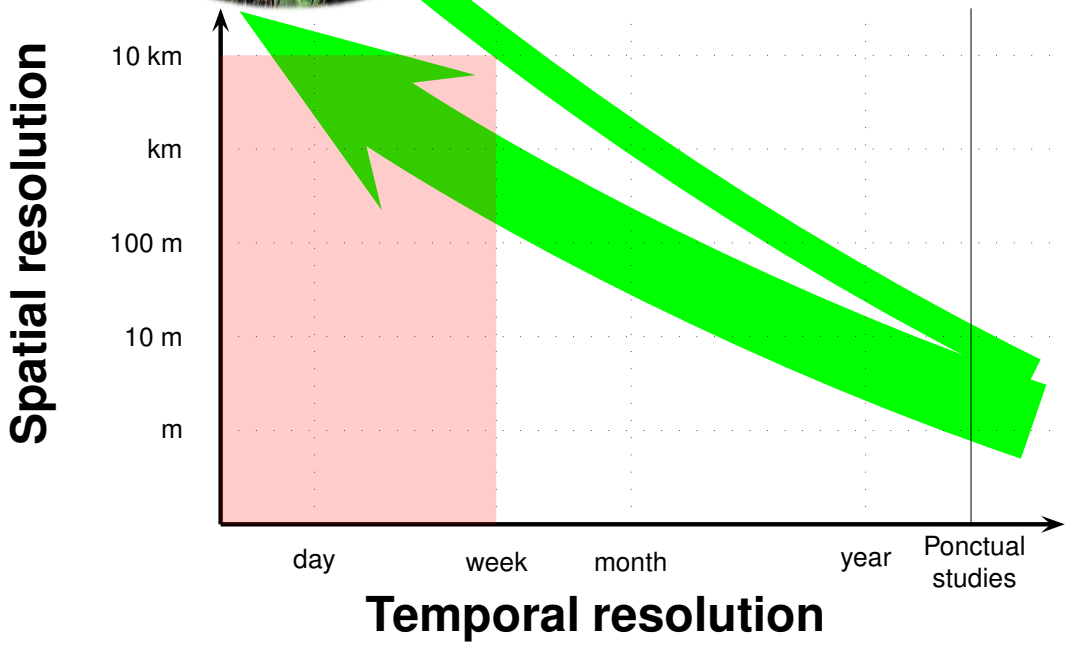

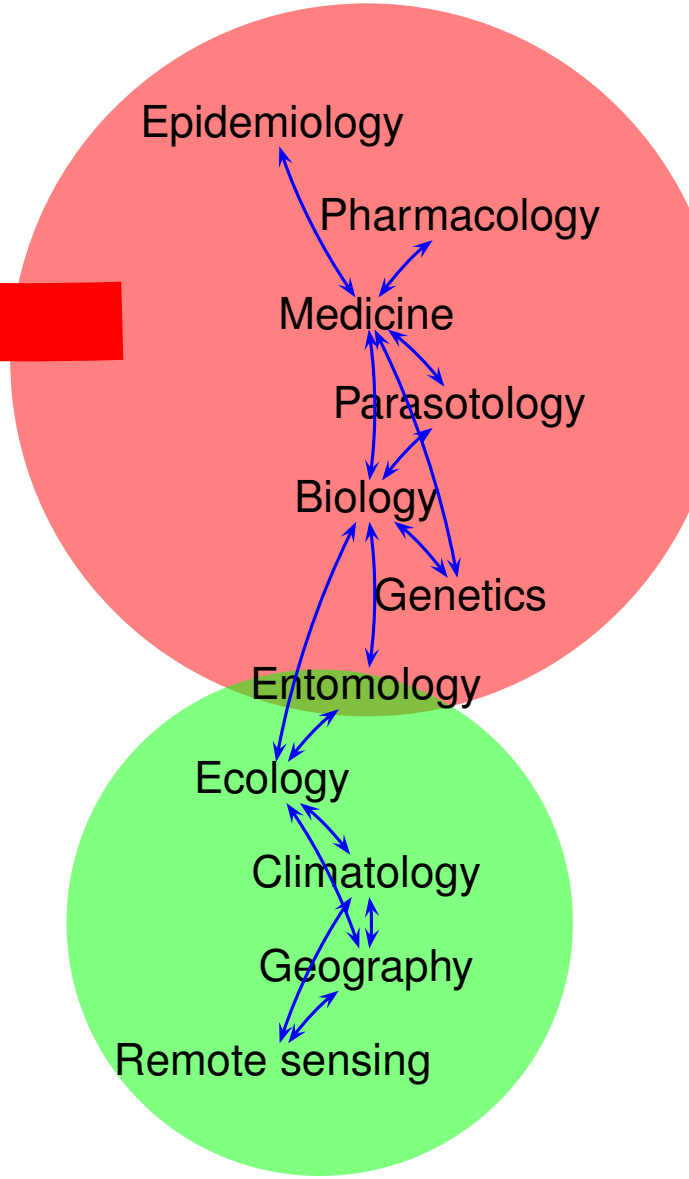

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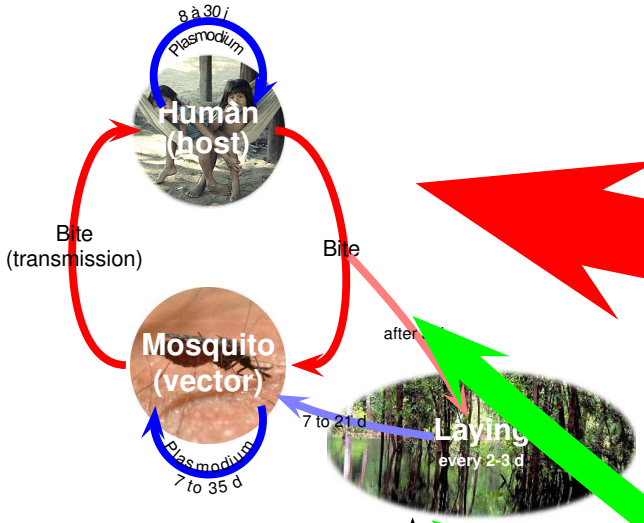
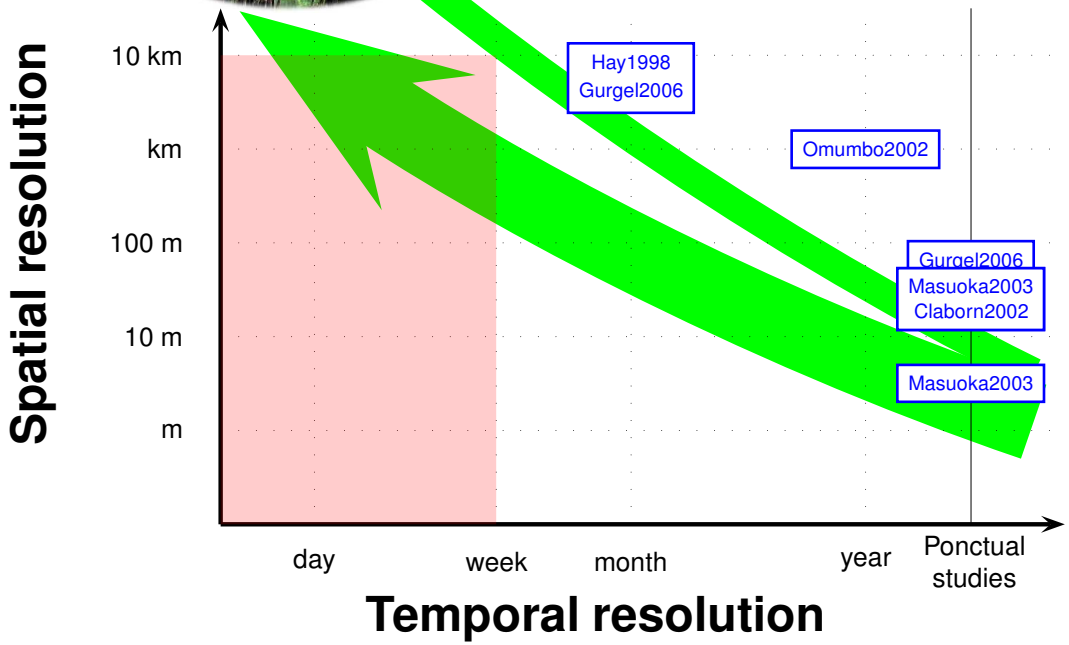
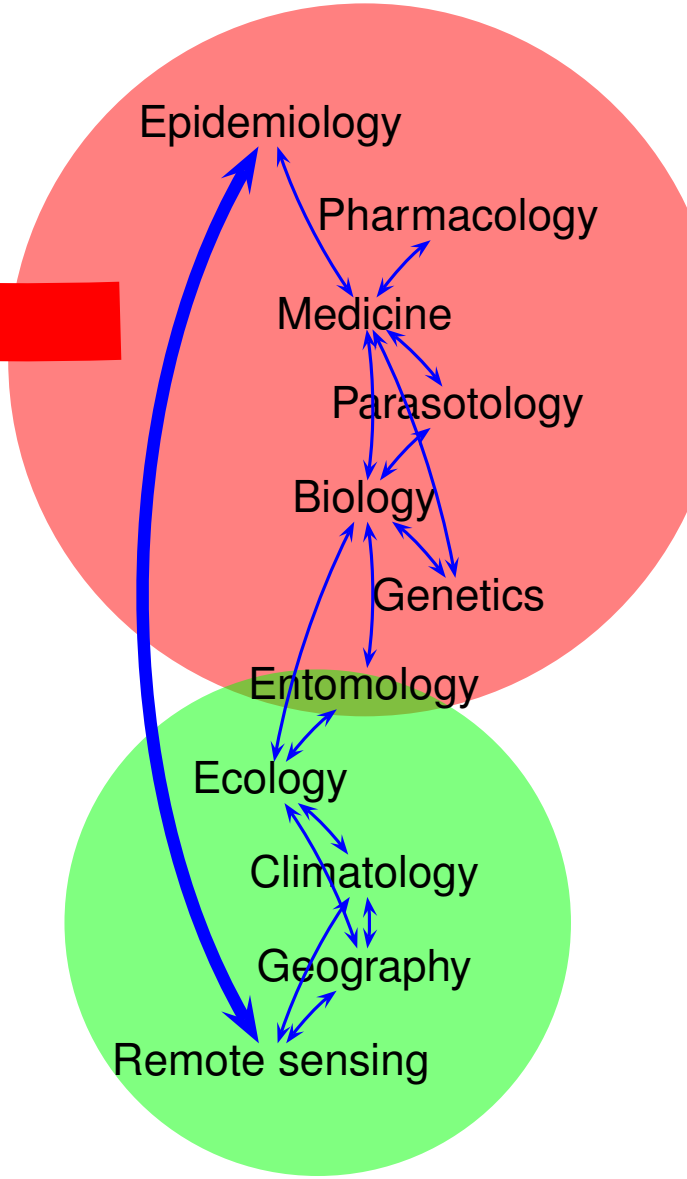
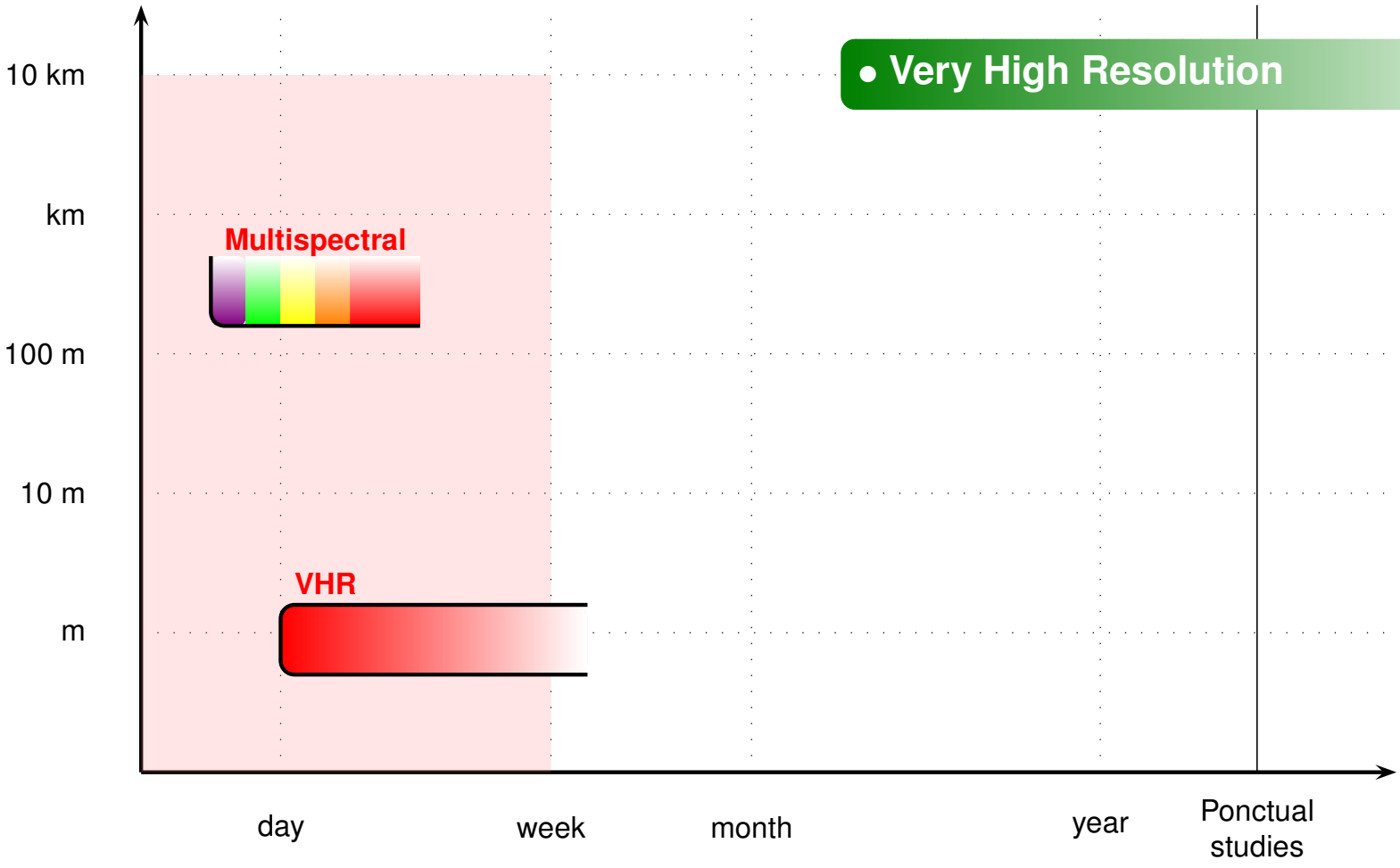






Remote Sensing

- Temporal resolution
- Very High Resolution



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- Temporal resolution
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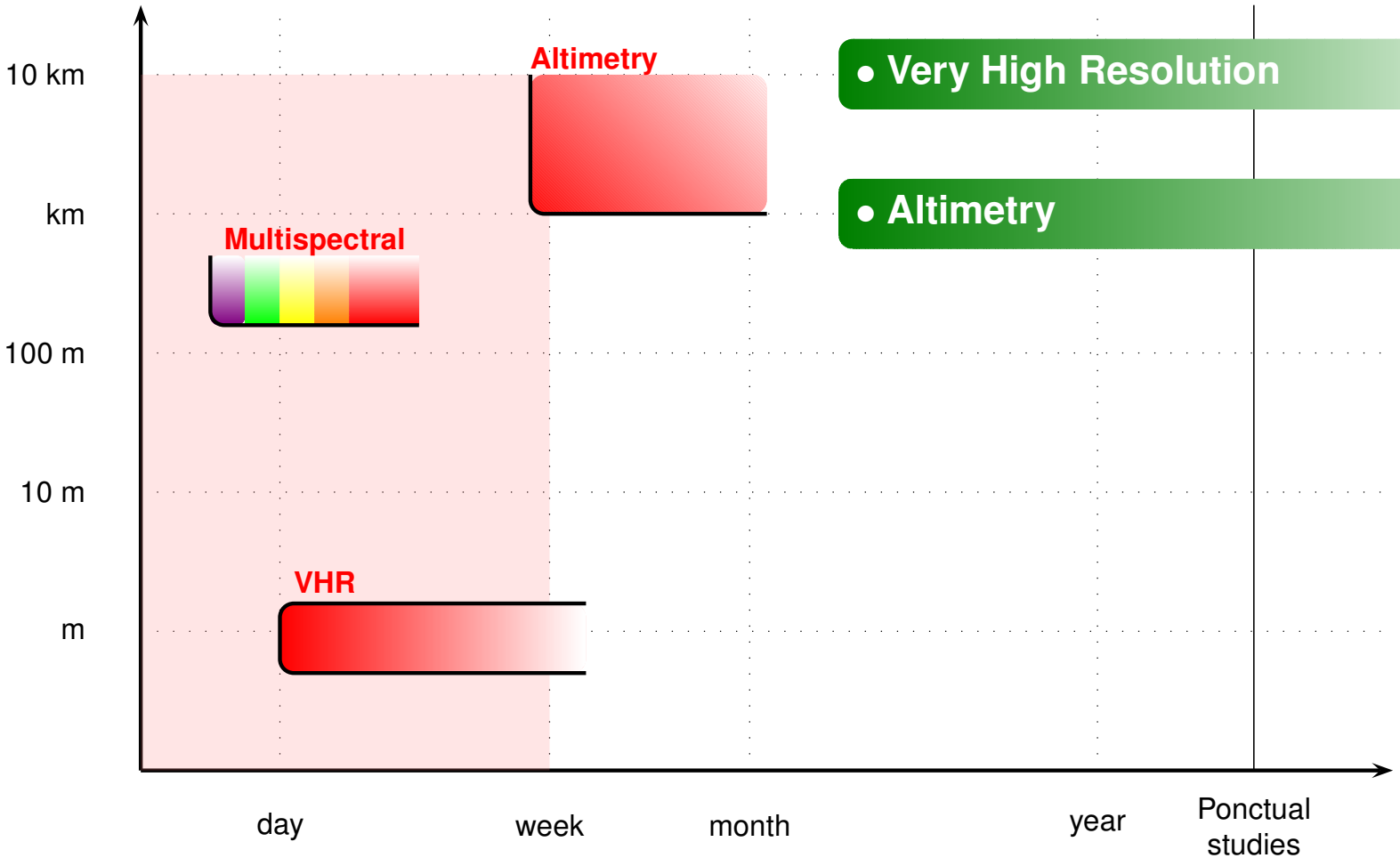
- Altimetry



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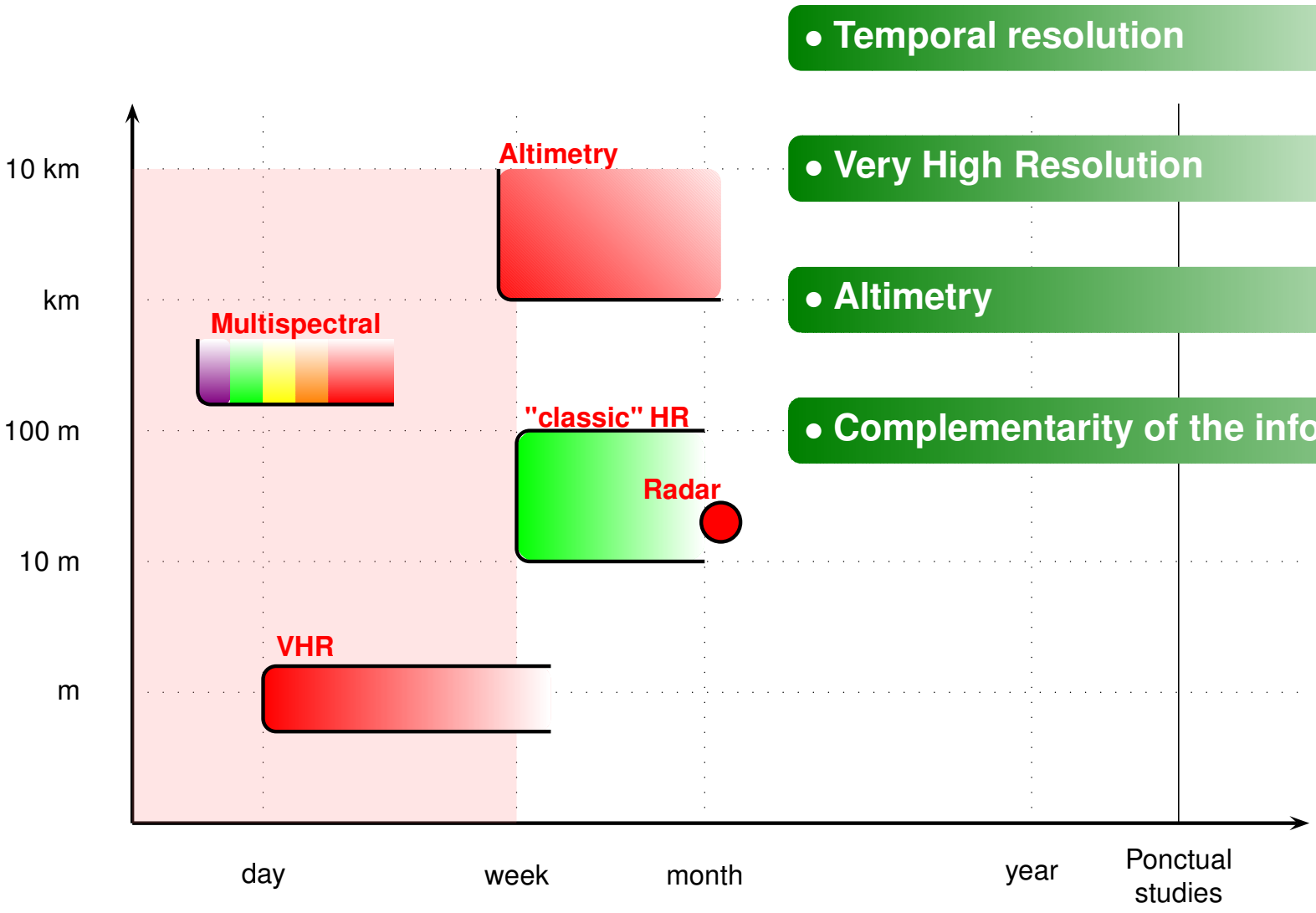
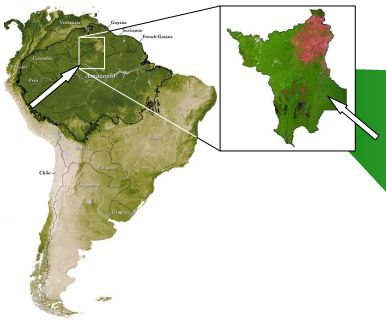
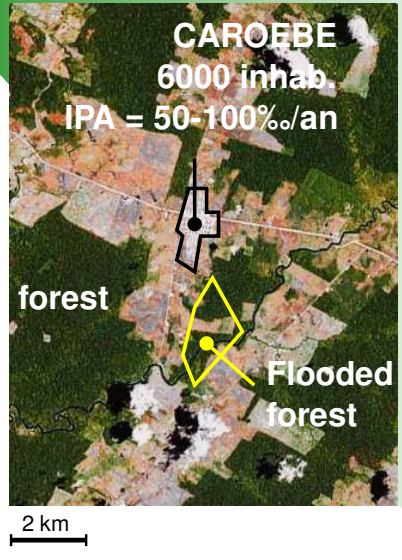
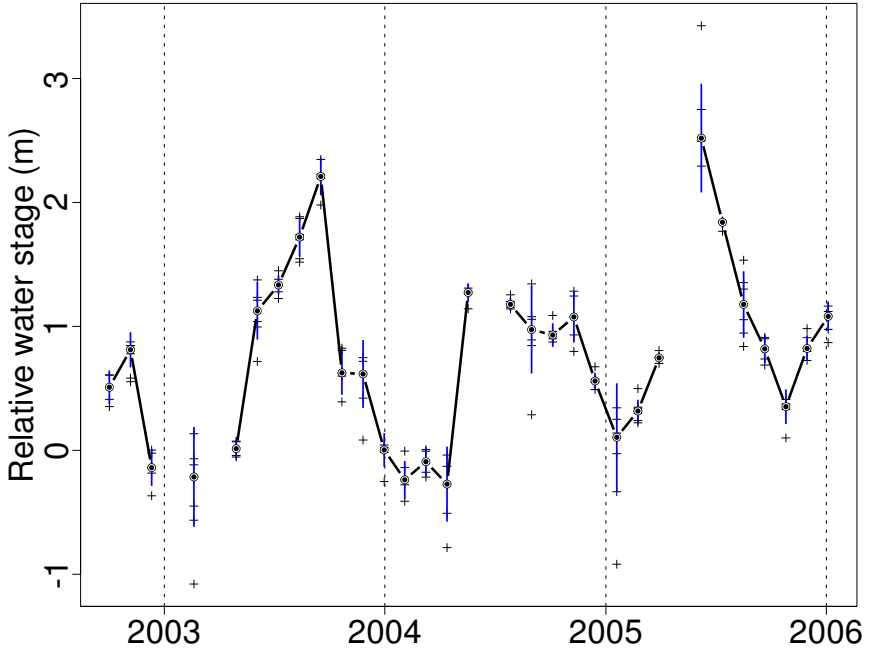


- Temporal resolution
- Very High Resolution
- Altimetry
- Complementarity of the information

Satellite Radar Altimetry and Malaria







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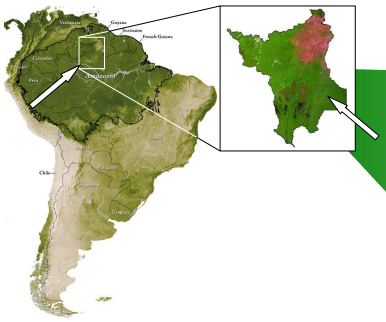
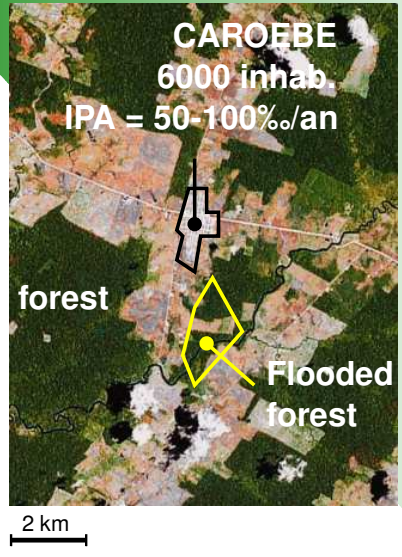
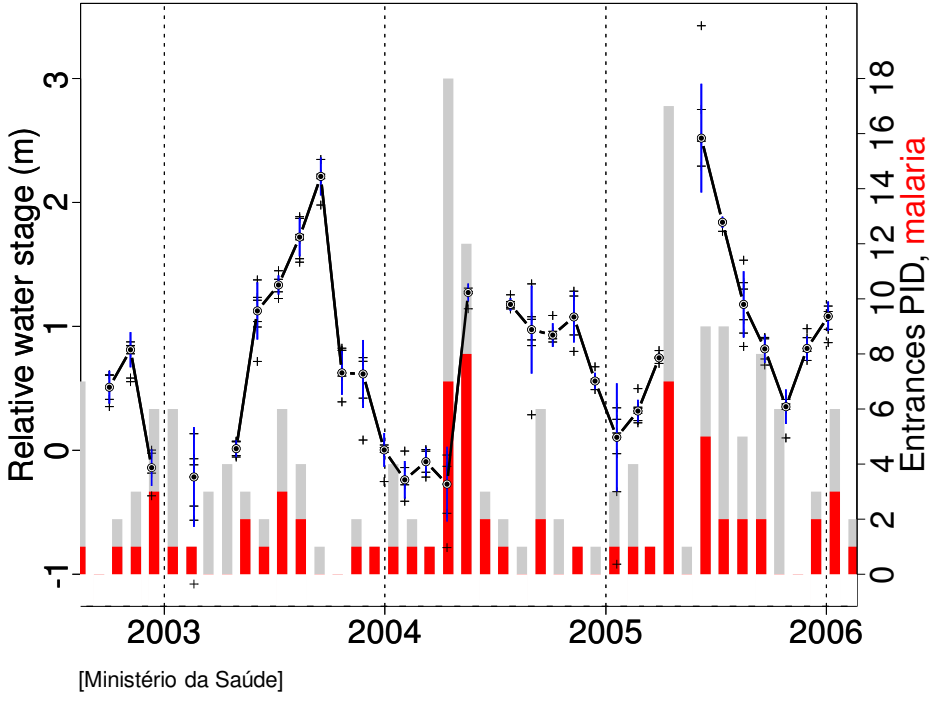




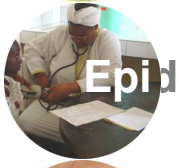


[Ministério da Saúde]

Integrative Approach - Data

Satellite based

In Situ



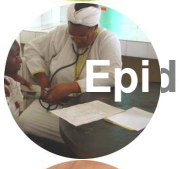
Epidemiological

Entomological

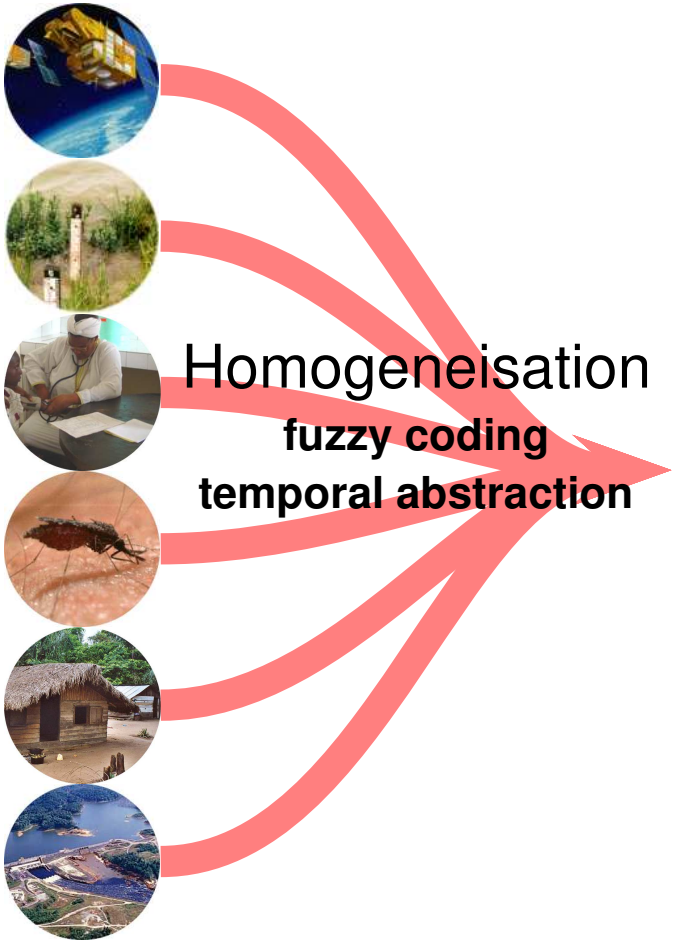
Sociologic

Public Policies related

Integrative Approach - Data

Satellite based	Vegetation index, water quality, altimetry, relief
In Situ	Pluviometry, quality, discharges
 Epidemiological	Incidence, population features
Entomological	Species, density, vectors' agressiveness
Sociologic	Social practices
Public Policies related	Public health, land settlement

Integrative Approach - Methodology



- **Multiple Correspondence Analysis**
- **Machine Learning**
- **Data Mining**

... Taking into account time and space ...

Plan

Environnement et (RE)émergence de Maladies Infectieuses en Bassin Amazonien

Environment and (RE)emergence of Infectious Diseases in the Amazonian Basin

Jean-Marie FOTSING (IRD-ESPACE)

Objectives

Identifying environmental, demographical, genetic factors that explain the emergence and transmission of the infectious diseases in humid tropical environment

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Methods

- Remote sensing (SEAS Guyane → SPOT 2,4,5, and ENVISAT)
- Experimental ponds (artificial breeding places)
- Epidemiological and entomological data
- Vectors and pathogenic agents genetics

PLUPH : Poor Land Use, Poor Health

Marc LUCOTTE (Institute of Environmental Sciences, Québec University, Montréal)

2 health issues

- Hg
- Chagas disease

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Methods

- 3 pilot communities
  - Riparian, relatively old
  - Recent near a road
  - Native
- Experimental parcels (pilot planting)
- Social networks

Environment and Health at OMP

"Environment and Health" Group

Chemists, geo-chemists, geologists,
mineralogists, ecologist
pharmacologist (UR152), remote sensing

→**Transverse research axis**

http ://www.lmtg.obs-mip.fr/user/sante

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IRD S140 ESPACE

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- Methods to **jointly analyse temporal, spatialized, heterogeneous data** have to by applied, adapted, developed
- **Transdisciplinary projects, research groups and networks** are emerging