Spatial Generalized Linear Mixed Models with Application to Prevalence Mapping

空间广义线性混合模型及其在预测流行病中的应用
2015 级硕士学位论文答辩

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方向：数据分析与统计计算

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Outline

例例 例 例 **例**

1. radionuclide concentrations on Rongelap Island
2. childhood malaria in the gambia
3. Loa loa prevalence in Cameroon and surrounding areas

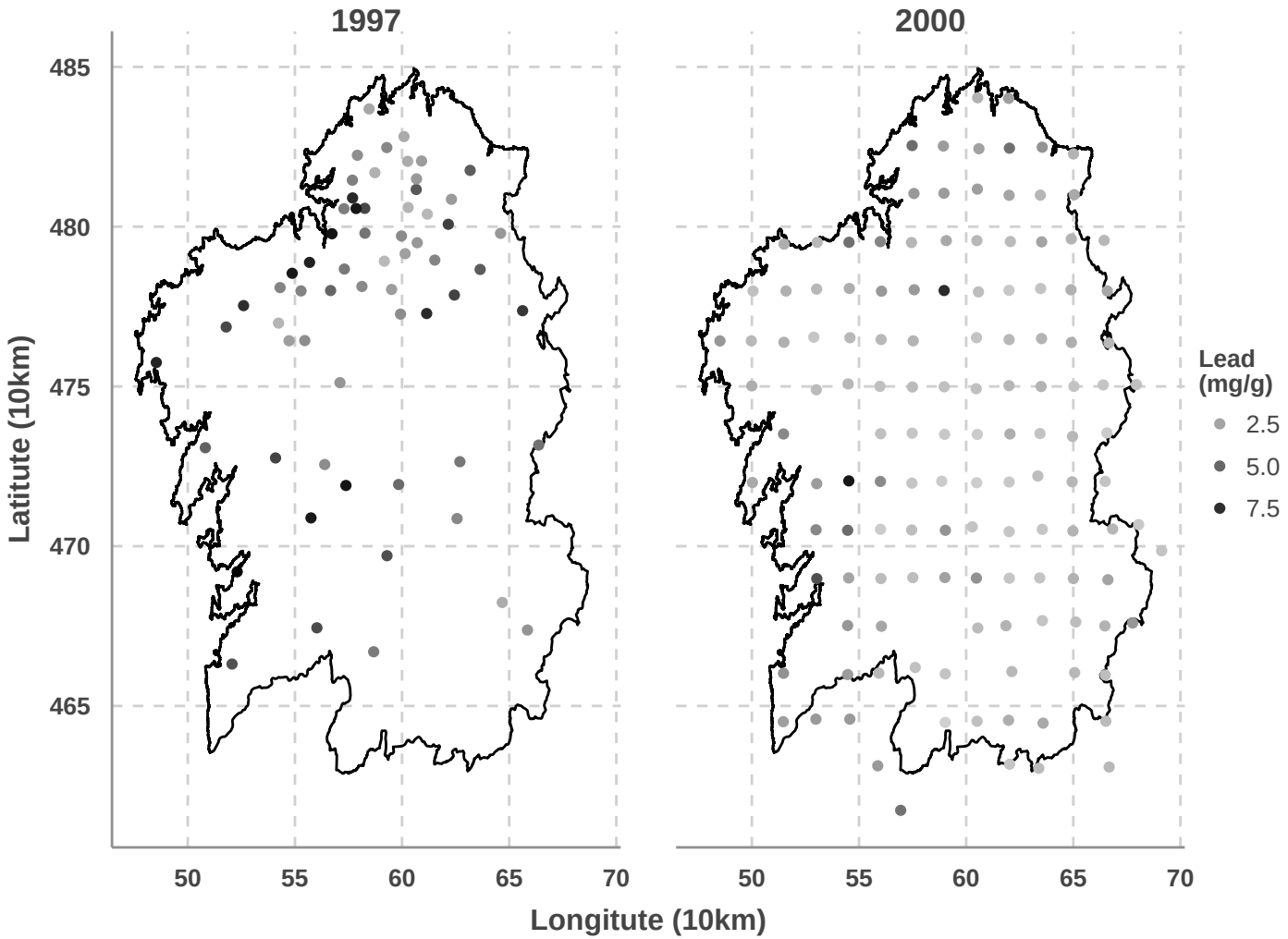
Introduction

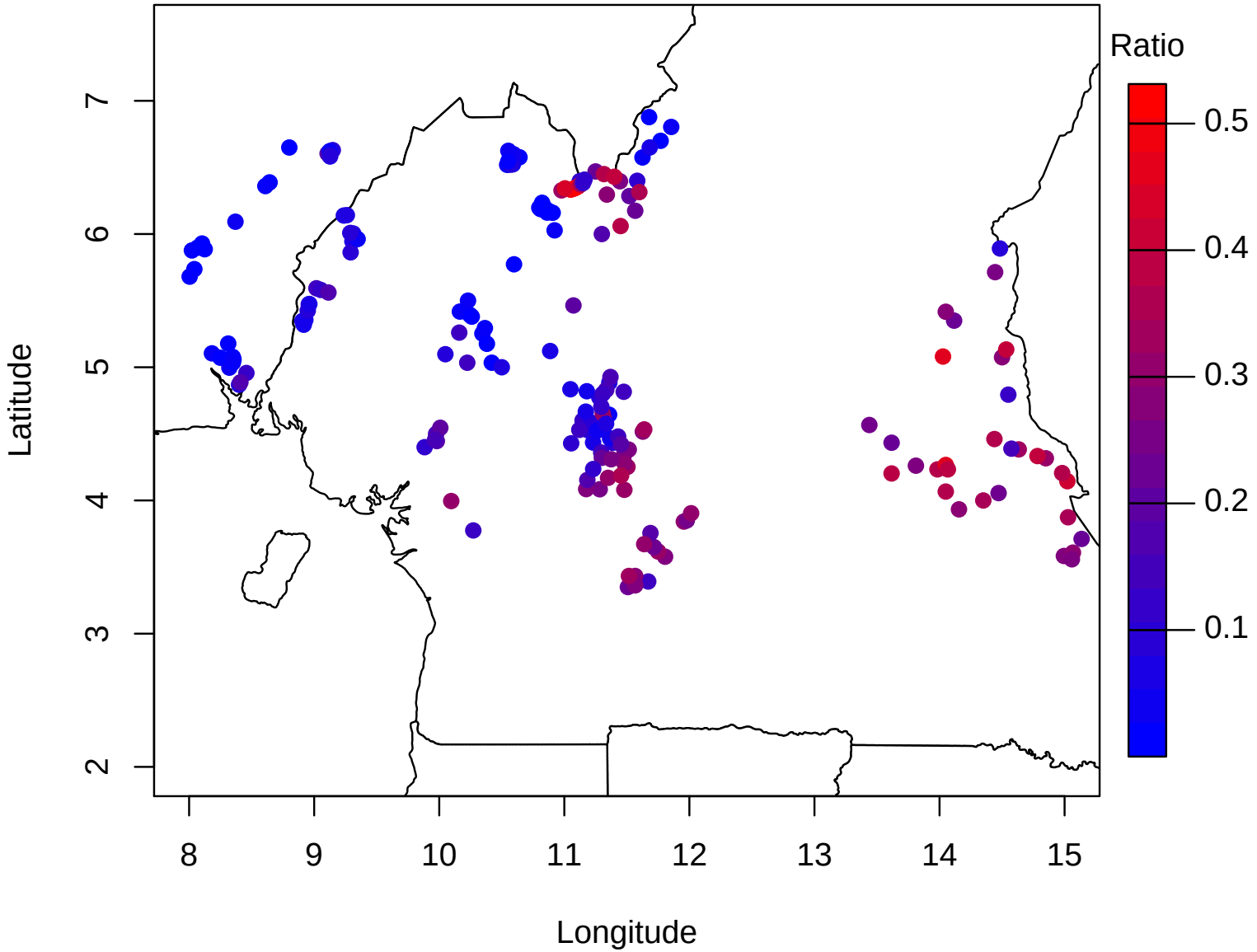
Diggle *et al.* (2002)

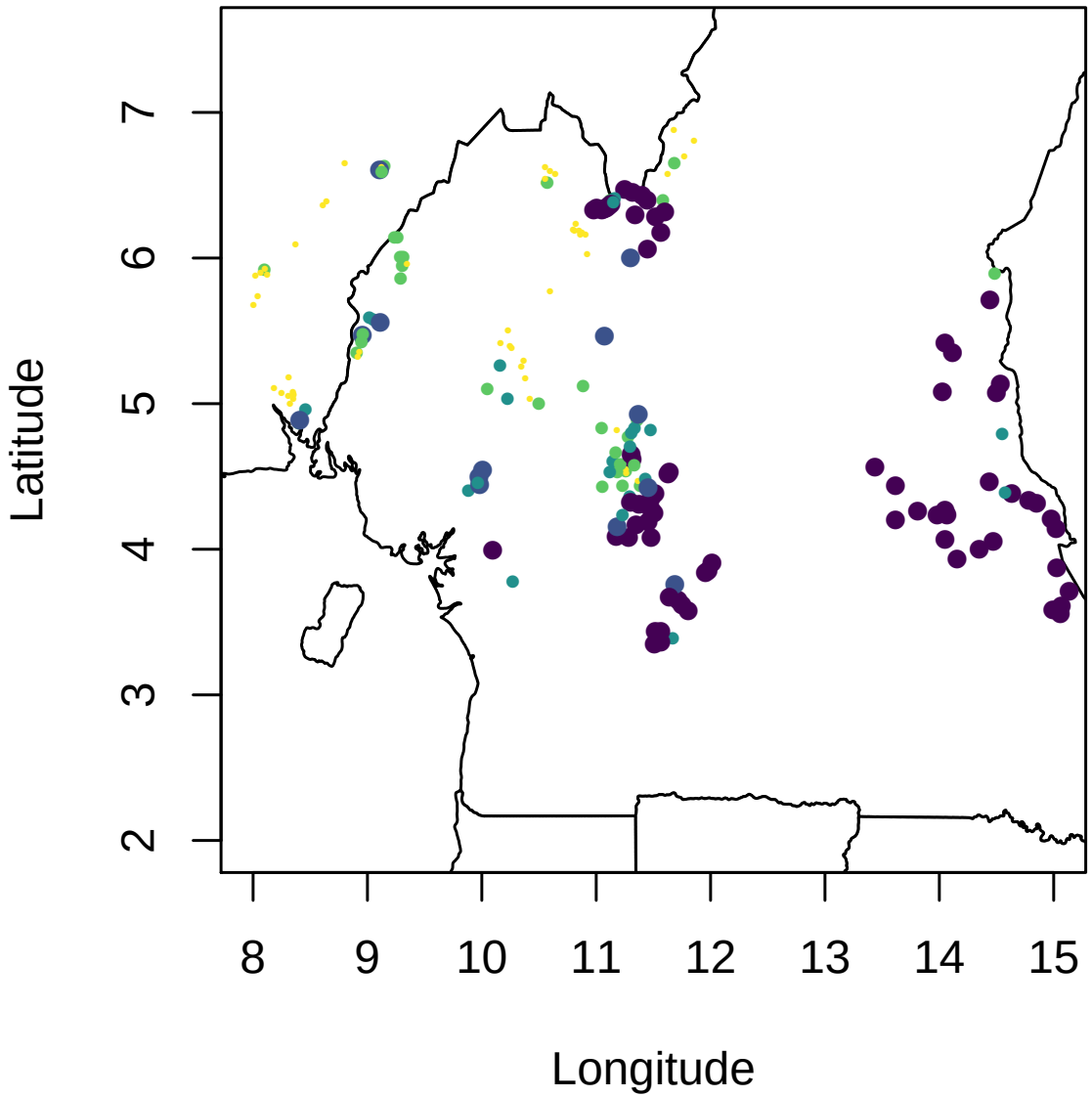
- First item in the list
- Second item
- and so on
  - First item in the list
  - Second item
  - and so on
- the effects of child level covariates (age and bed net use)
- village level covariates (the primary health care and greenness of surrounding vegetation)
- separate components for residual spatial
- non-spatial extrabinomial variation

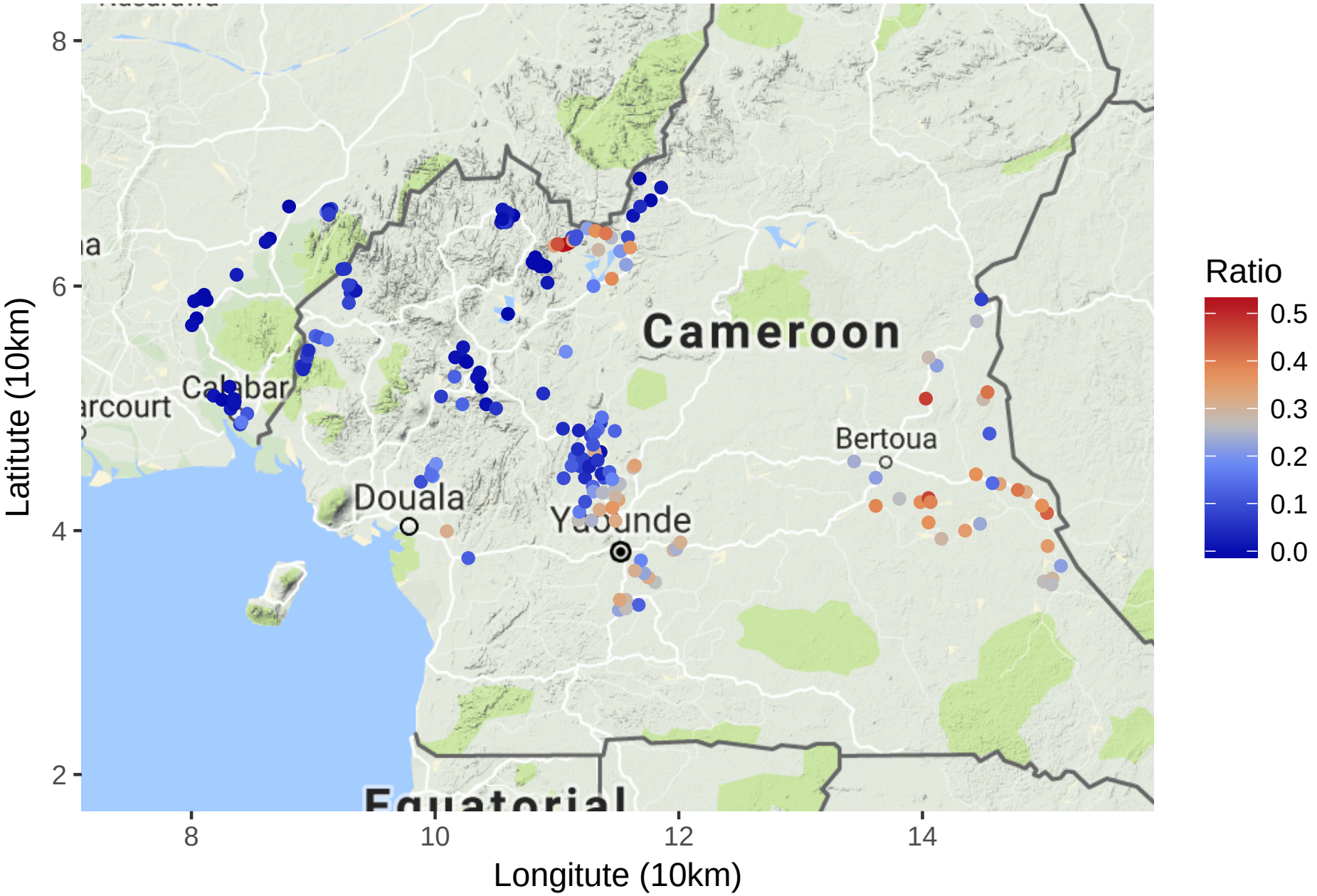
$\mathbb{R}^n$

$$\log\{p_{ij}/(1-p_{ij})\} = \alpha + \beta' z_{ij} + U_i + S(x_i)$$


1997
2000
485
480
475
470
465
Latitute (10km)
50
55
60
65
70
Longitute (10km)
Lead (mg/g)
2.5
5.0
7.5


Ratio
0.5
0.4
0.3
0.2
0.1
Latitude
2
3
4
5
6
7
Longitude
8
9
10
11
12
13
14
15


Latitude
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Longitude


Cameroon
Douala
Yaounde
Bertoua
Latitute (10km)
Longitute (10km)
8
6
4
2
8
10
12
14
Ratio
0.5
0.4
0.3
0.2
0.1
0.0

Thank You

References I

Diggle, Peter, Moyeed, Rana, Rowlingson, Barry, & Thomson, Madeleine. 2002. Childhood malaria in the Gambia: a case-study in model-based geostatistics. *Journal of the Royal Statistical Society: Series C (Applied Statistics)*, **51**(4), 493–506.

Softwares and Tools

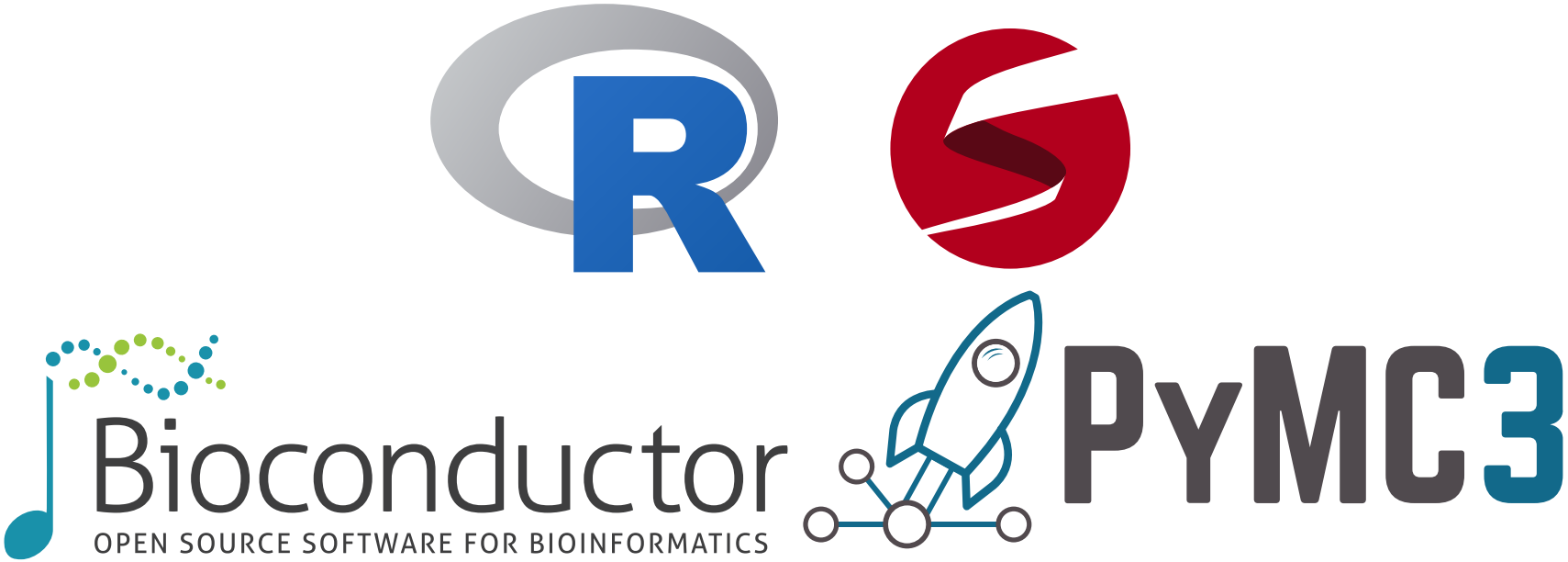


图: GNU R INLA Stan PyMC3

Github


GeoDa
TM


Bioconductor
OPEN SOURCE SOFTWARE FOR BIOINFORMATICS