

Pertinence écologique de la vitesse du changement climatique

L. Moinat, I. Gaponenko, S. Goyette, J. Kasparian

Groupe nonlinéarité et climat

*Groupe de physique appliquée & Institut des sciences de l'environnement
Département de physique de la matière quantique*

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FACULTÉ DES SCIENCES



**UNIVERSITÉ
DE GENÈVE**

Comment vont migrer les animaux ?

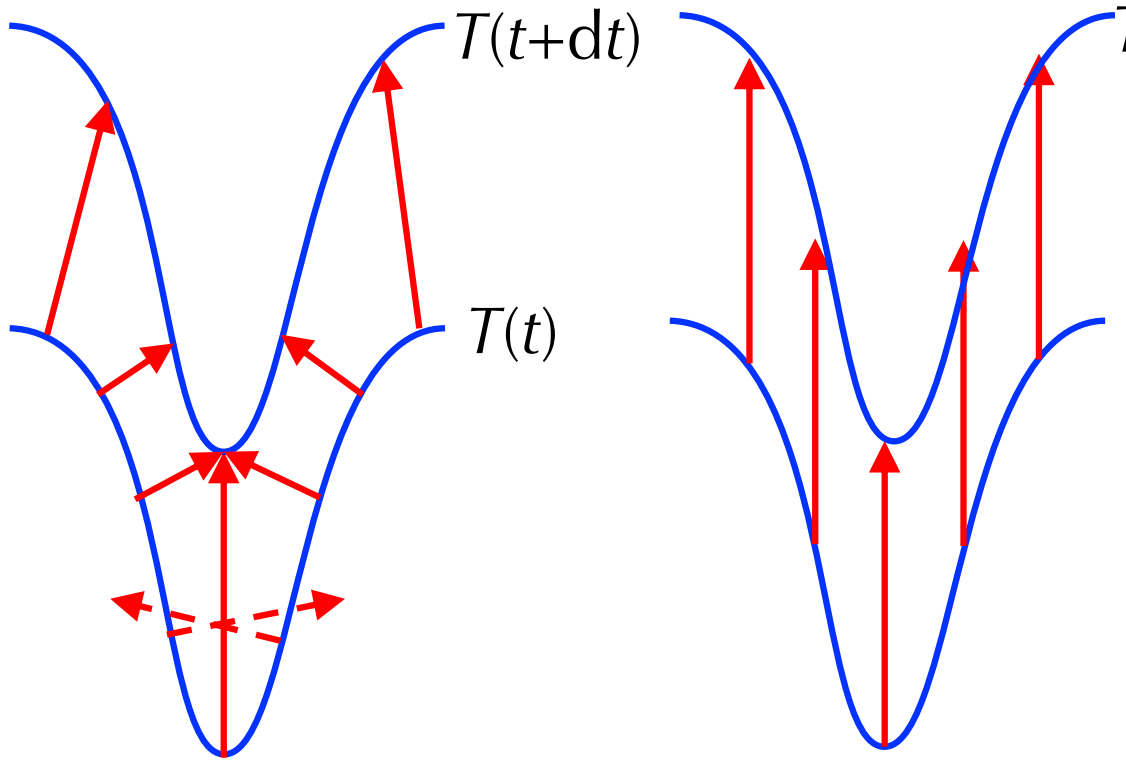
Alternative climate change velocity definitions: Ecological assessment

Laure Moinat^{1,2}, Iaroslav Gaponenko³, Stéphane Goyette^{1,2}, Jérôme Kasparian^{1,2}

1. University of Geneva, Group of Applied Physics, Rue de l'École de Médecine 20, CH-1211 Geneva 4, Switzerland

2. University of Geneva, Institute of Environmental Sciences, Bd Carl-Vogt 66, CH-1211 Geneva 4, Switzerland

3. University of Geneva, Department of Quantum Matter Physics, Quai Ernest-Ansermet 24, CH-1211 Geneva 4, Switzerland



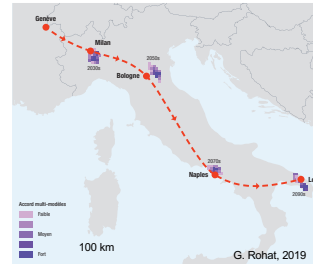
Gradient ? ou Champ régulier ?

I. Gaponenko *et al.*, Scientific Reports **12**, 2997 (2020)
 L. Moinat *et al.*, Soumis à *Climate Change Biology*

Velocity of climate change

Motivations

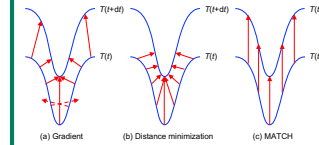
- Assess adaptation
- Intuitive perception
- Outreach tool



Ill-posed problem

- Velocity: vector field
- Temperature: Scalar field

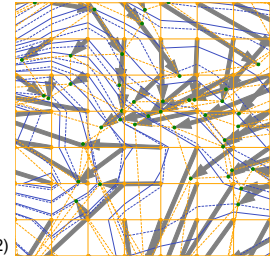
MATCH vs. gradient



Classical approach (Loarie *et al.*, Nature 2009): Gradient
 Our approach (MATCH): Smooth field (minimize vorticity).
 Minimize interactions between migrating groups

Monte-Carlo Iteration-convergence method (MATCH)

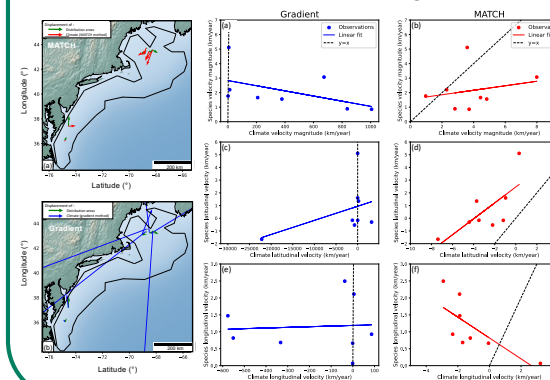
Choose a grid point at random
 Random move, bound by nearest neighbors
 Re-interpolate temperature map
 Minimize difference with the final temperature map



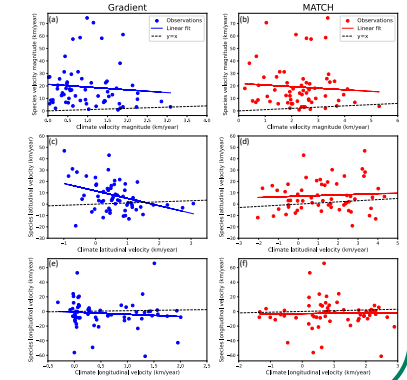
I. Gaponenko *et al.* Sci. Rep. **12**, 2997 (2022)

Ecological assessment

North-East US Atlantic coastal region



North-American birds



Conclusion and outlook

Marine species

- MATCH matches latitudinal displacement only
- Gradient: No agreement

Birds

- No agreement: Non-climatic drivers dominate migration

Outlook

- Multiparameter MATCH
 - Further species and regions
- L. Moinat *et al.*, submitted to *Global Change Biology*