



# Ghiacciaio del Morteratsch

Glaciologia e Climatologia Alpina

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# Morteratsch in numeri

## 1 Introduzione

- Superficie: 14.93 km<sup>2</sup>
- Volume: 0.899 km<sup>3</sup>
- Quota fronte: 2117 m
- Quota massima: 4049 m
- Spessore medio: 61.4 m
- Spessore massimo: 280.7 m

Dati da Bauder, Huss e Linsbauer 2022



Figura: Foto da [SwissEduc](#)



# Confronto

## 1 Introduzione



**Figura:** Ghiacciaio del Morteratsch nel 1883 e nel 2021. (Fabiano Ventura - 2021)



# Vadret Pers

## 1 Introduzione

- Separato dal Morteratsch nel 2017
- Superficie:  $6.7 \text{ km}^2$
- Quota minima: 2450 m
- Quota massima: 3900 m

Dati da Bauder, Huss e Linsbauer 2022



Figura: Foto da [SwissEduc](#)



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# Variazioni frontali

## 2 Analisi

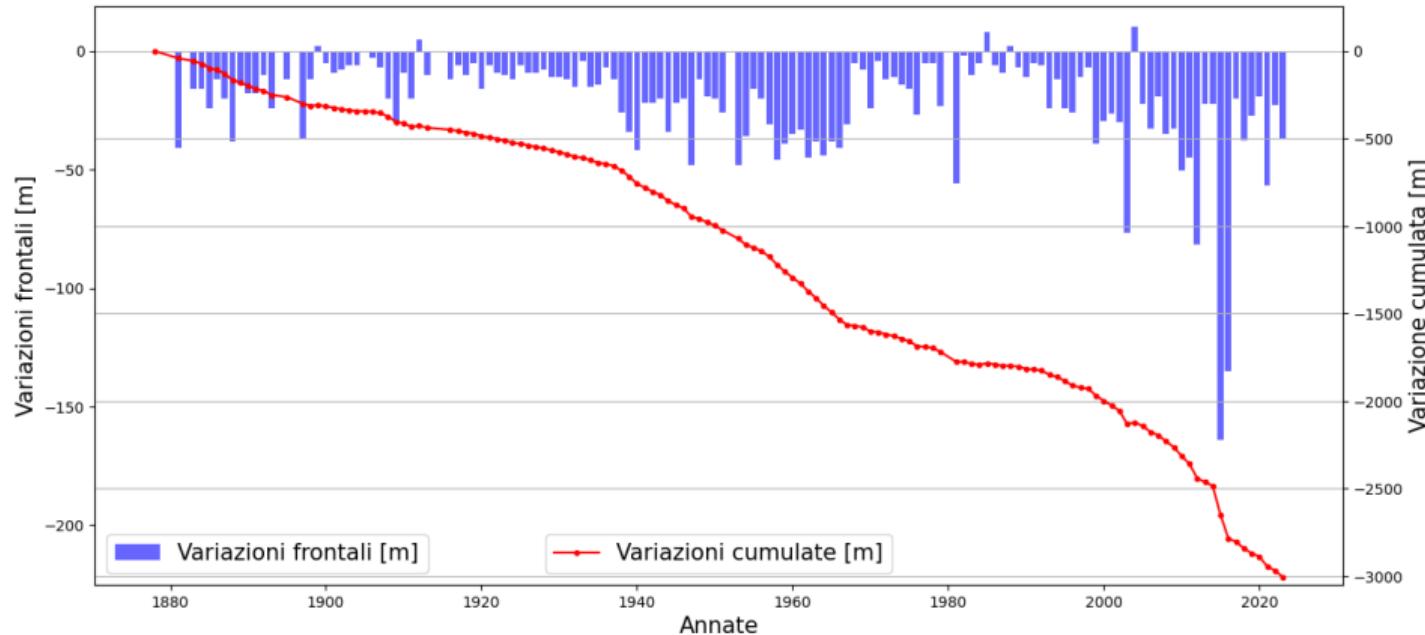
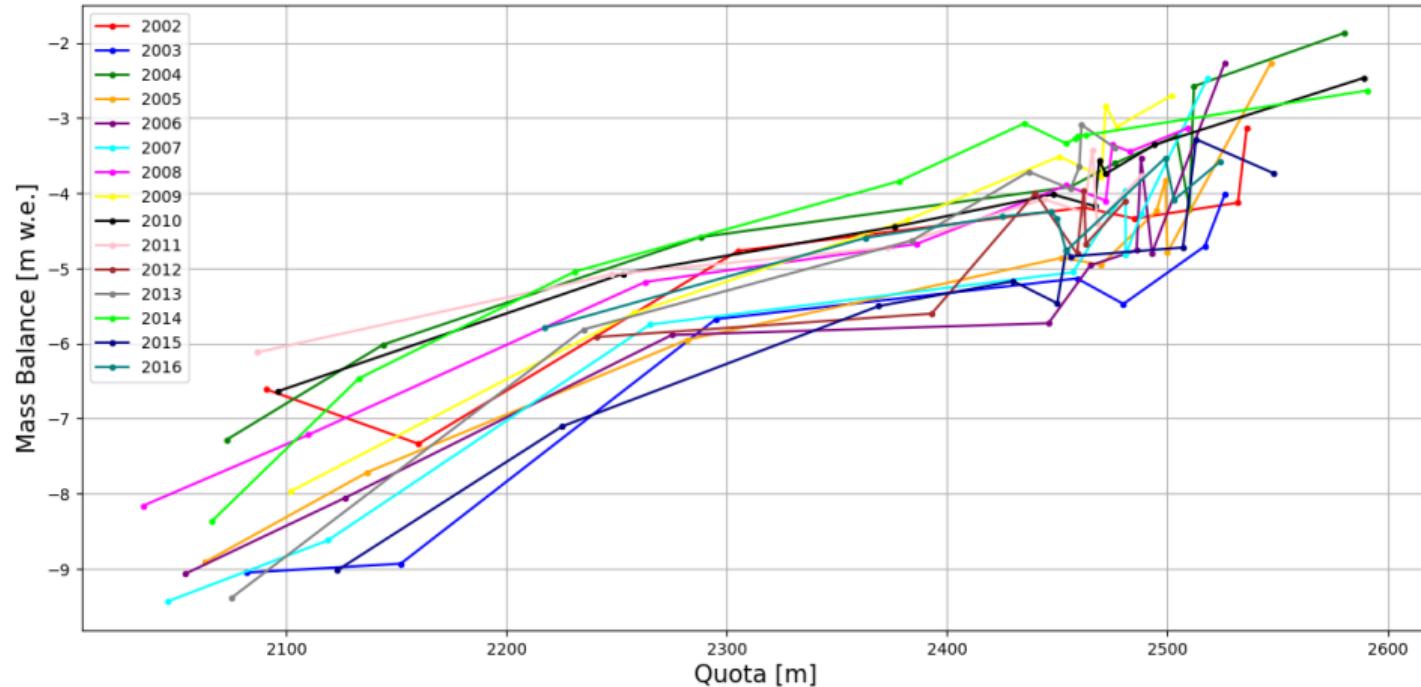


Figura: Dati da Bauder, Huss e Linsbauer 2023



# Ablation stakes Morteratsch

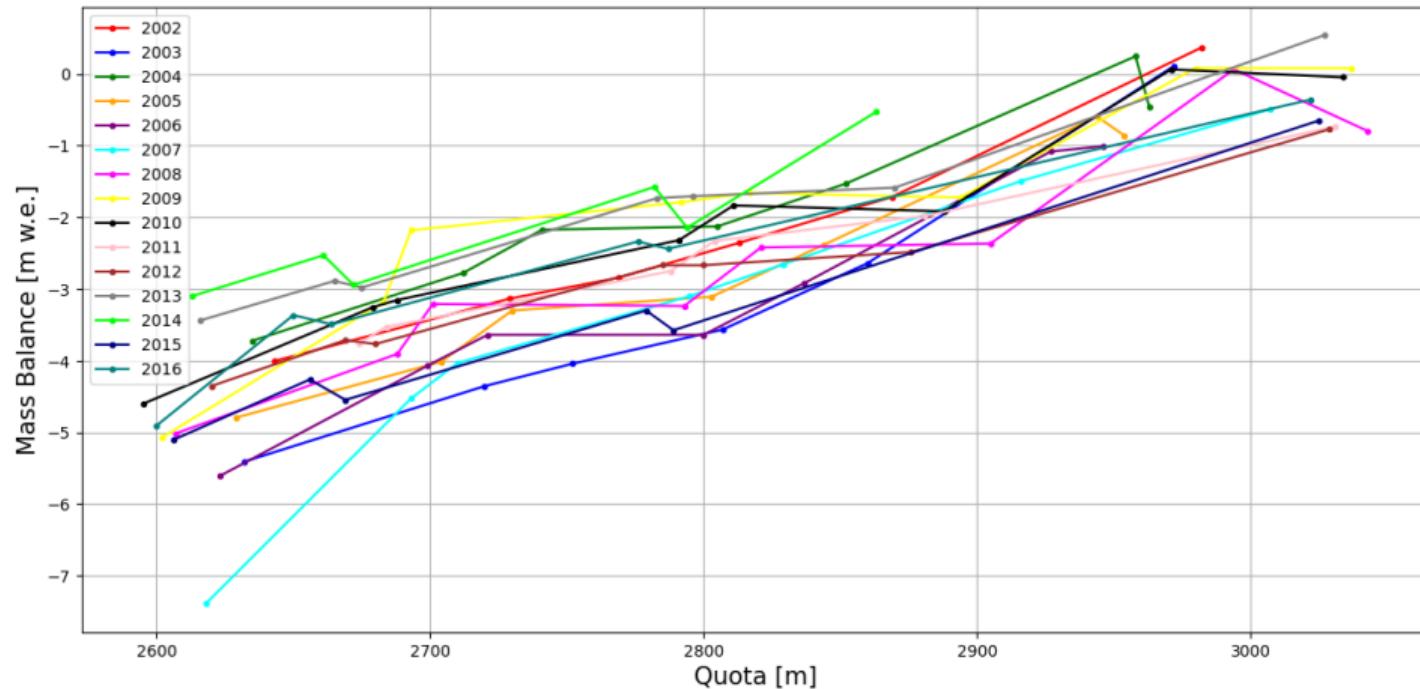
## 2 Analisi





# Ablation stakes Vadret Pers

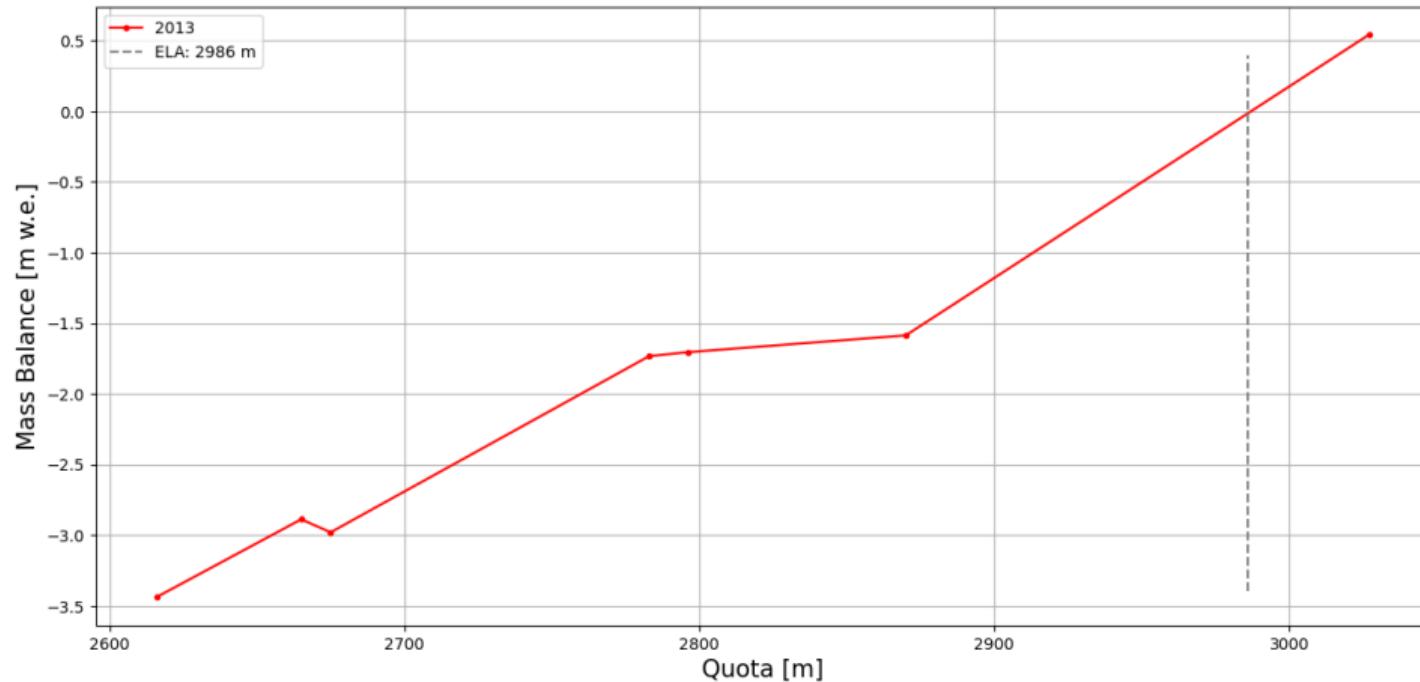
## 2 Analisi





# ELA Vadret Pers

## 2 Analisi





# AWS Morteratsch

## 2 Analisi



Figura: Foto da [IMAU](#)



# Shortwave radiation

## 2 Analisi

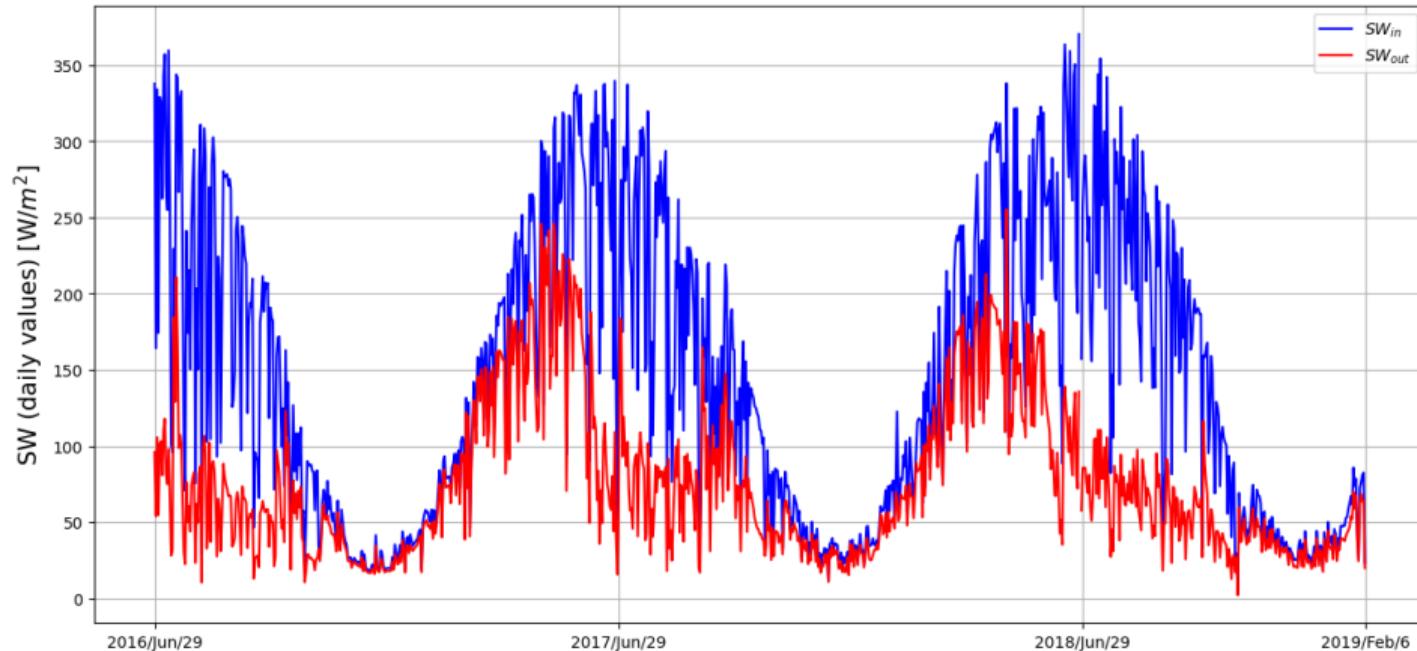
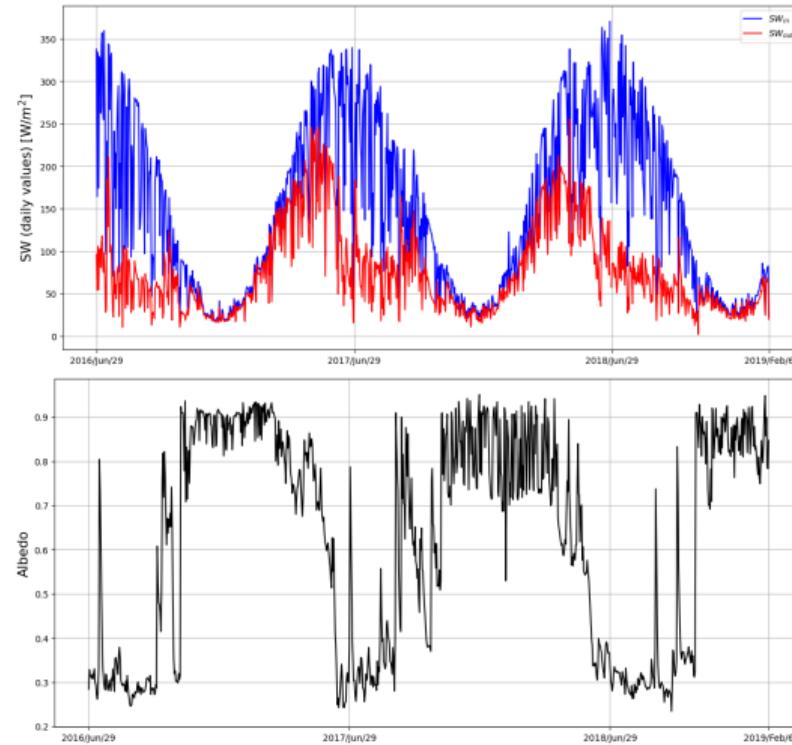


Figura: Dati da Oerlemans

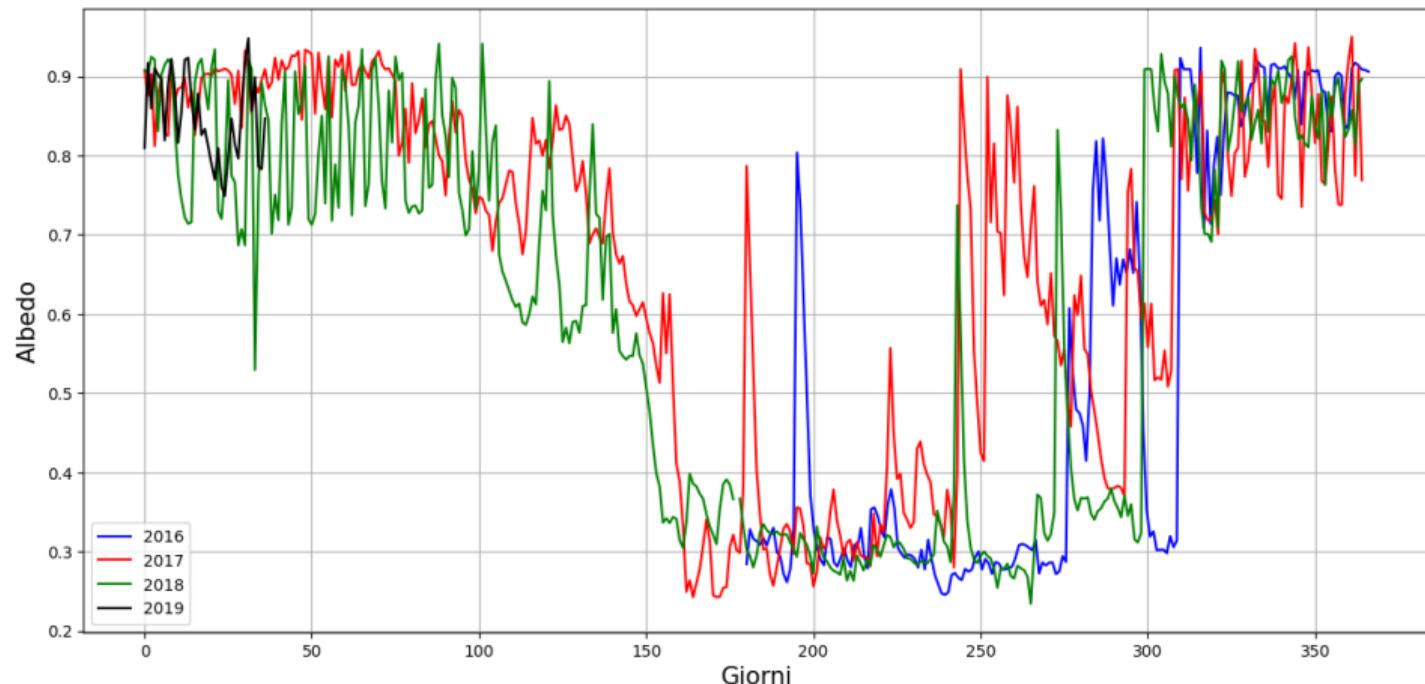


# Albedo





## Albedo per year





# Longwave radiation

## 2 Analisi

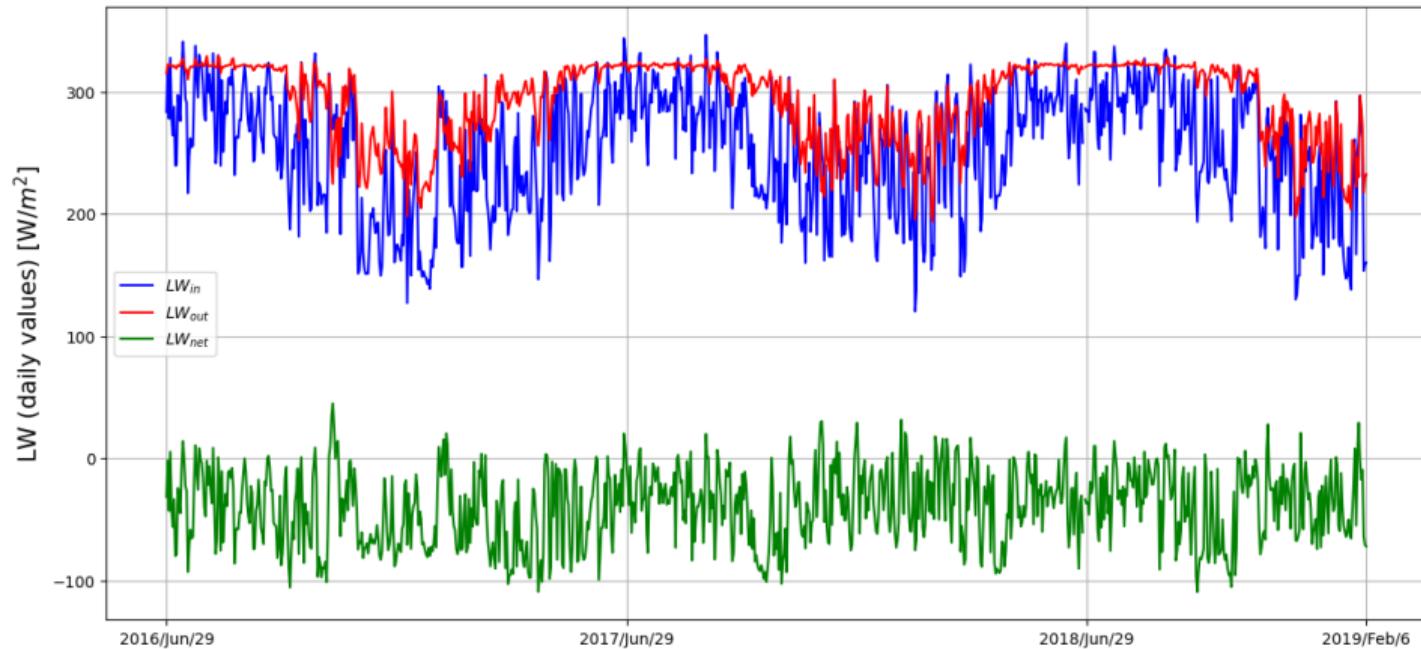


Figura: Dati da Oerlemans



# Total energy budget

## 2 Analisi

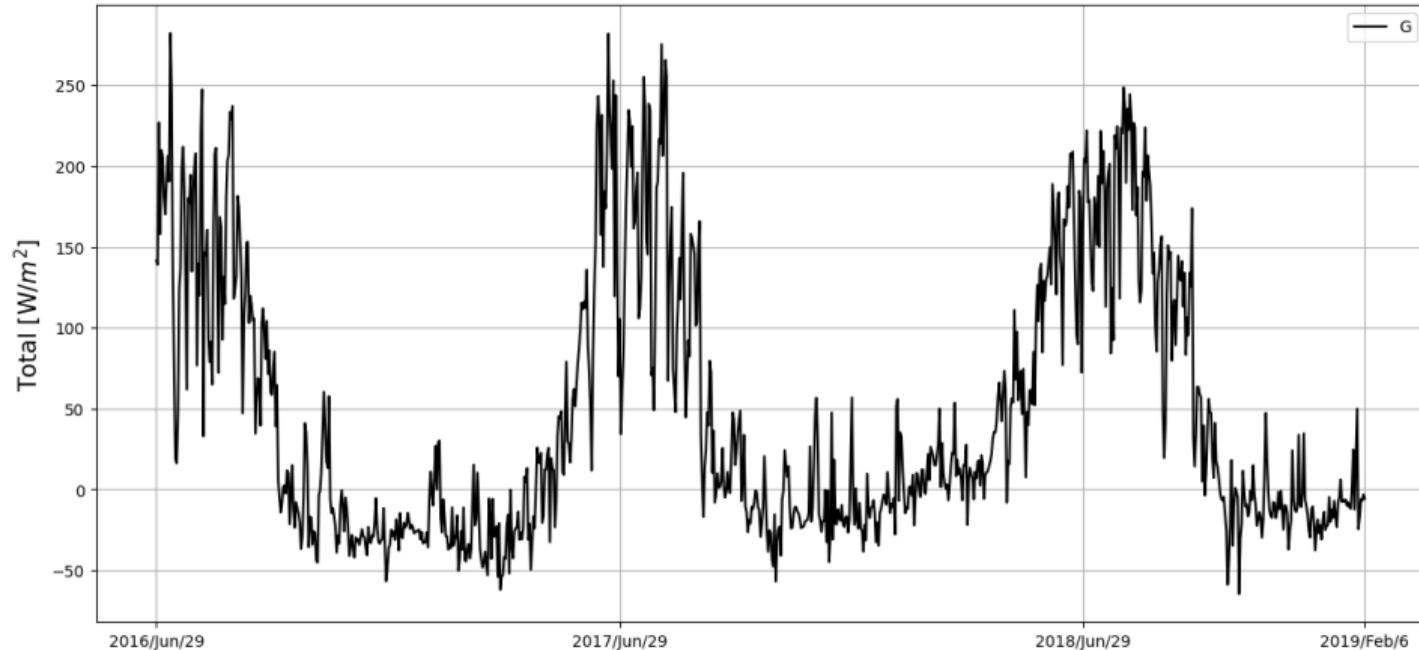
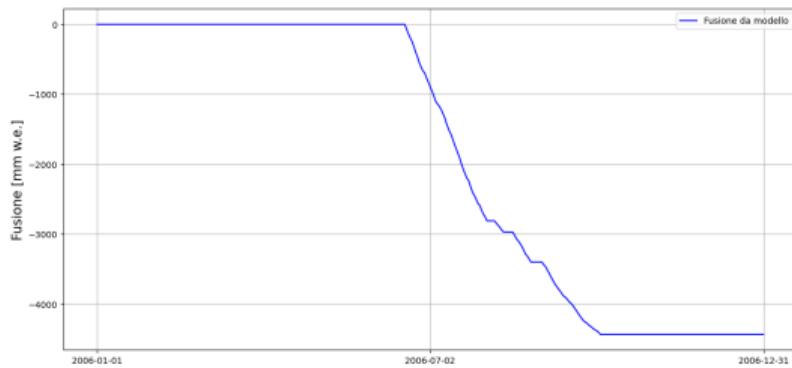
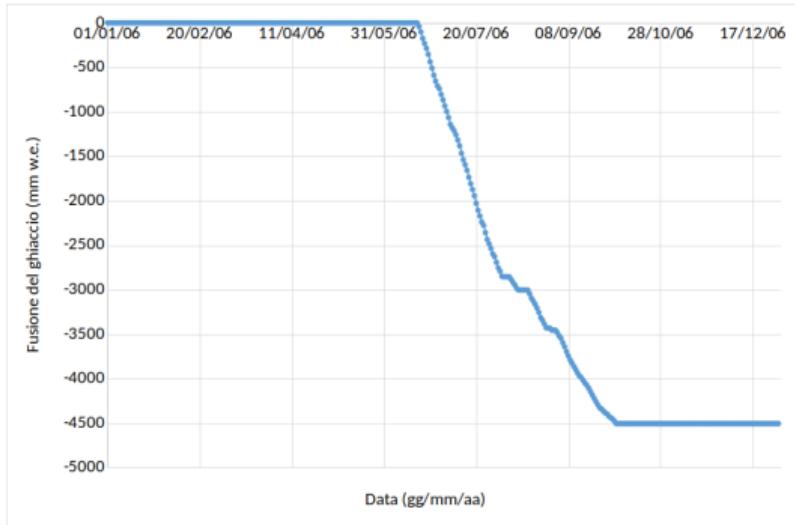


Figura: Dati da Oerlemans



# Benchmark

## 2 Analisi





# Melt

## 2 Analisi

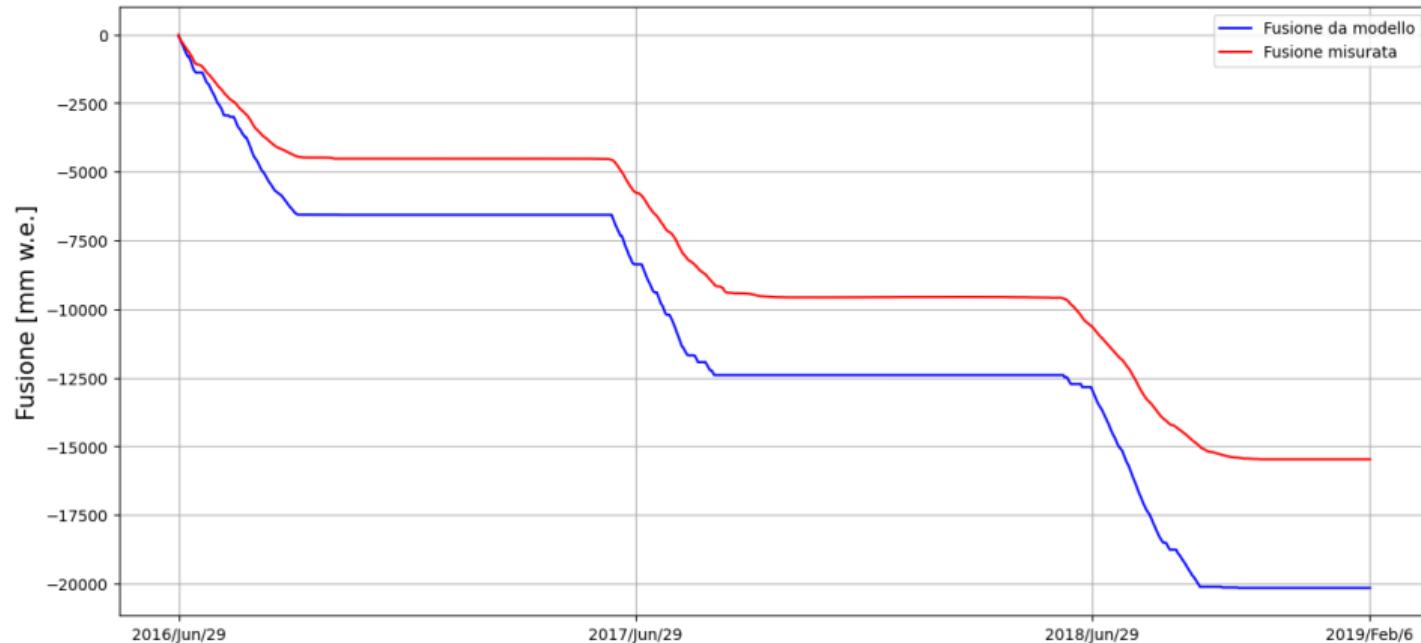


Figura: Dati da Oerlemans



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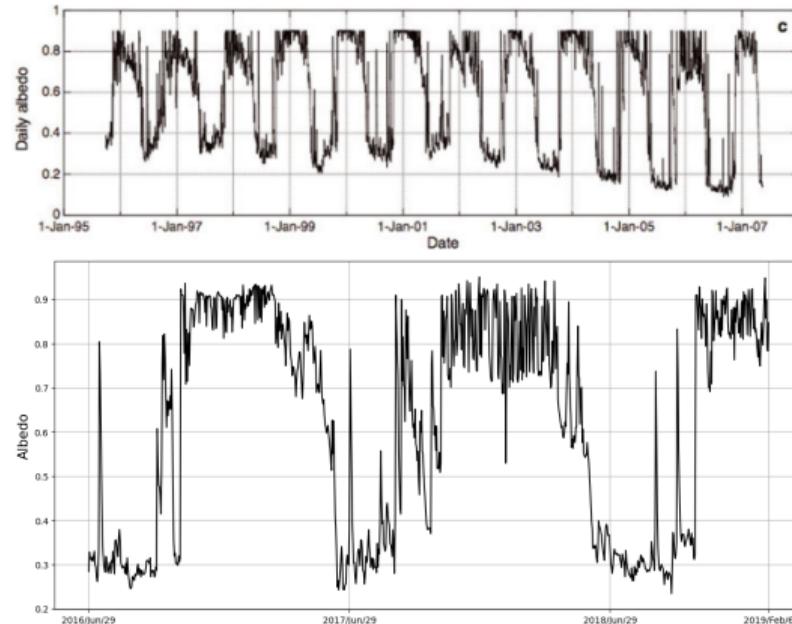
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# Daily albedo values

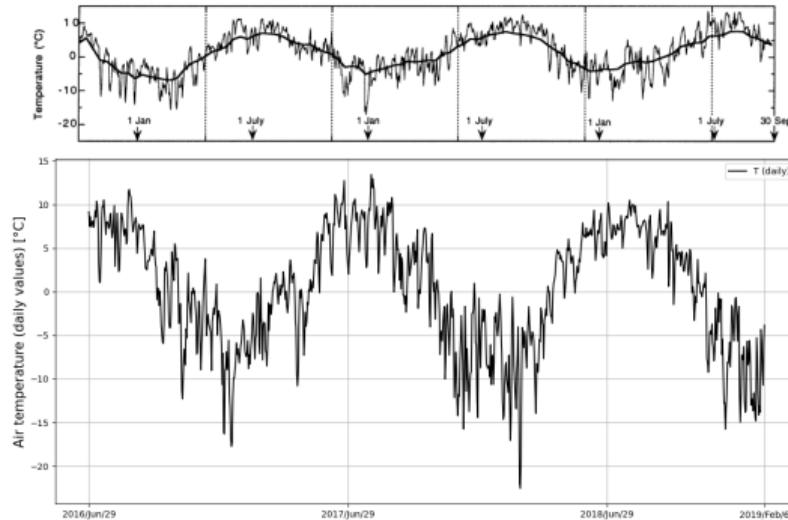
## 3 Confronto





# Daily temperature values

## 3 Confronto





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# Conclusioni

## 4 Conclusioni

- Ritiro frontale di 3005 metri dall'inizio delle misurazioni
- Perdita di circa 5 m w.e. nei pressi del fronte glaciale
- Tendenza all'aumento della temperatura dell'aria a parità di quota



**Fine**

4 Conclusioni

Grazie per l'attenzione



# Bibliografia

## 4 Conclusioni

- Bauder, Andreas, Matthias Huss e Andreas Linsbauer (2022). «The Swiss Glaciers 2019/20 and 2020/21». In: *Glaciological Report No. 141/42 of the Cryospheric Commission (EKK) of the Swiss Academy of Sciences (SCNAT)*. doi: 10.18752/grep\_141-142)
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- Zekollari, Harry e Philippe Huybrechts (2018). «Statistical modelling of the surface mass-balance variability of the Morteratsch glacier, Switzerland: strong control of early melting season meteorological conditions». In: *Journal of Glaciology* 64.244, pp. 275–288. doi: 10.1017/jog.2018.18)



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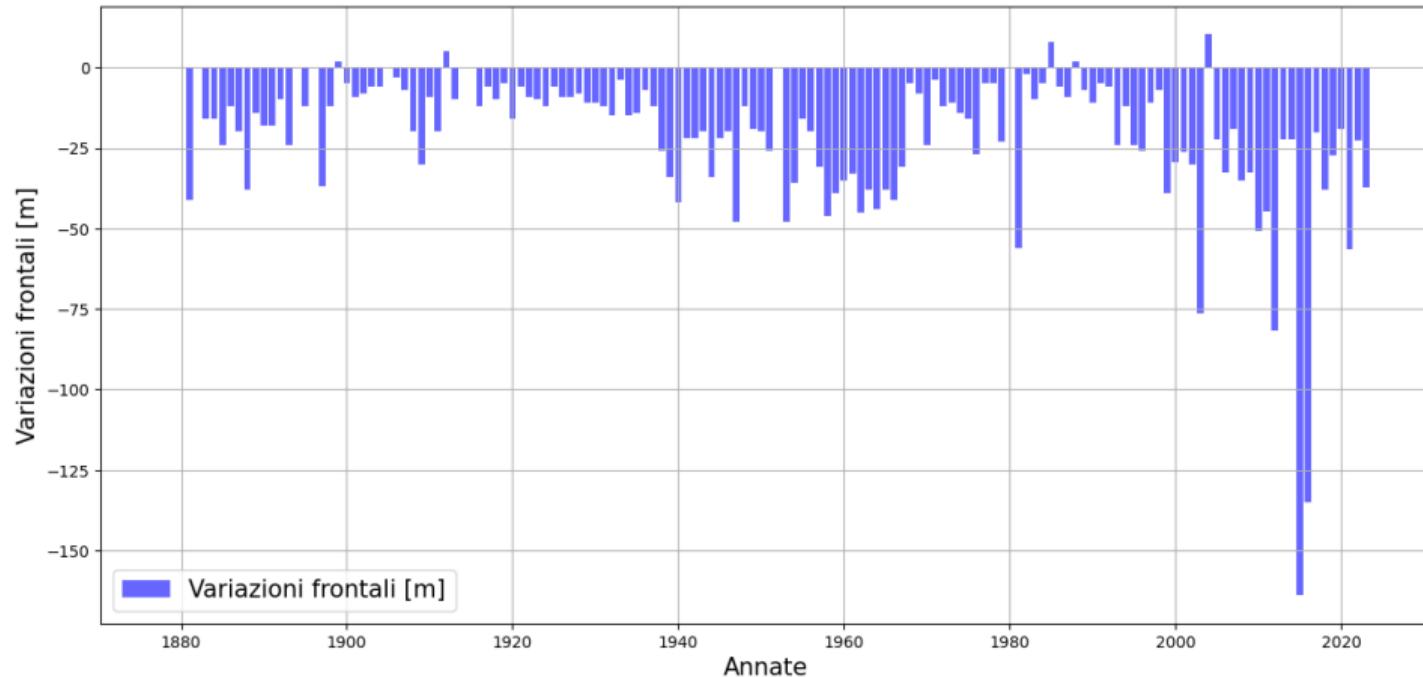
## 5 Backup

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# Variazioni frontali

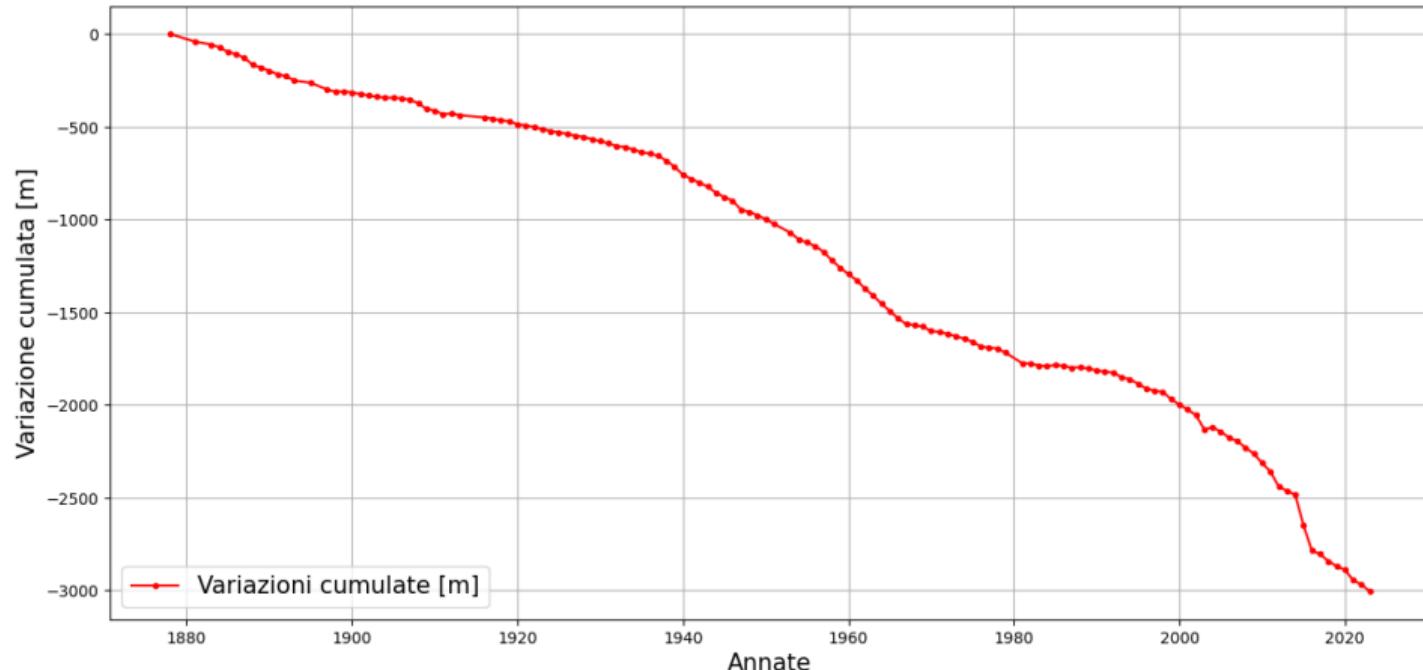
5 Backup





# Variazioni cumulate

5 Backup





# Short-wave radiation

## 5 Backup

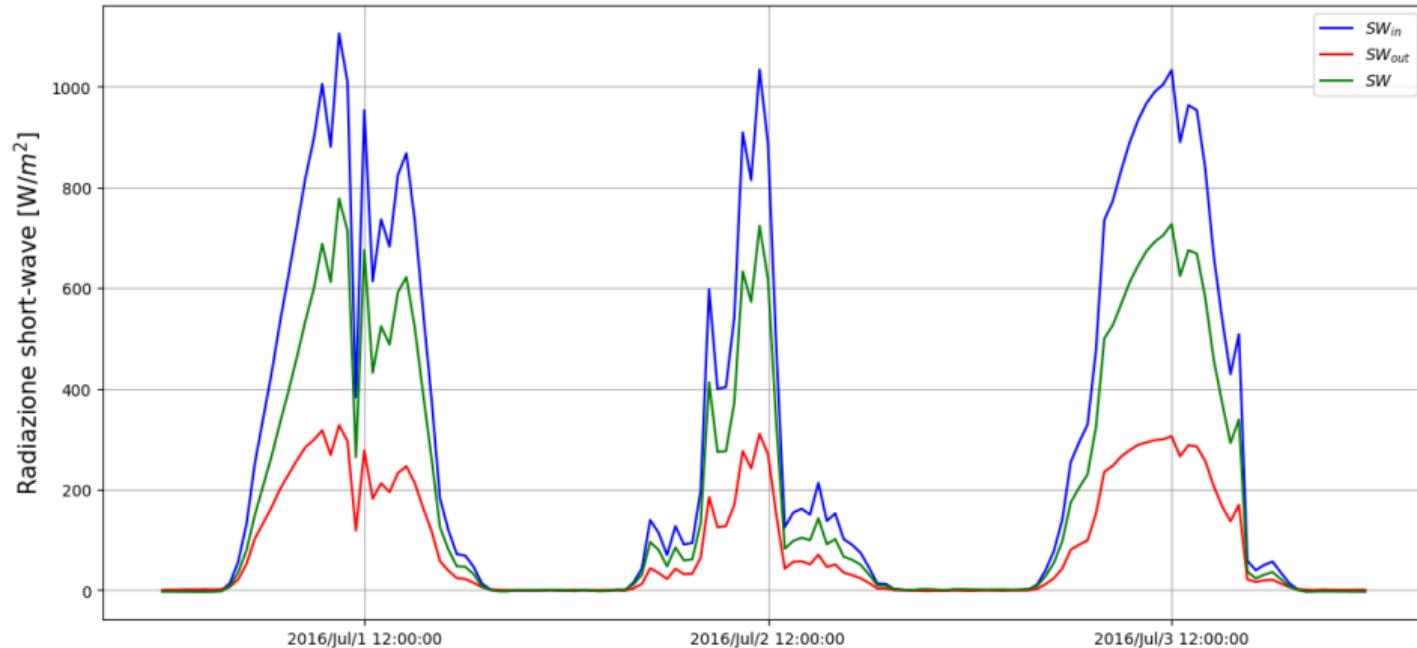


Figura: Dati da Oerlemans



# Long-wave radiation

## 5 Backup

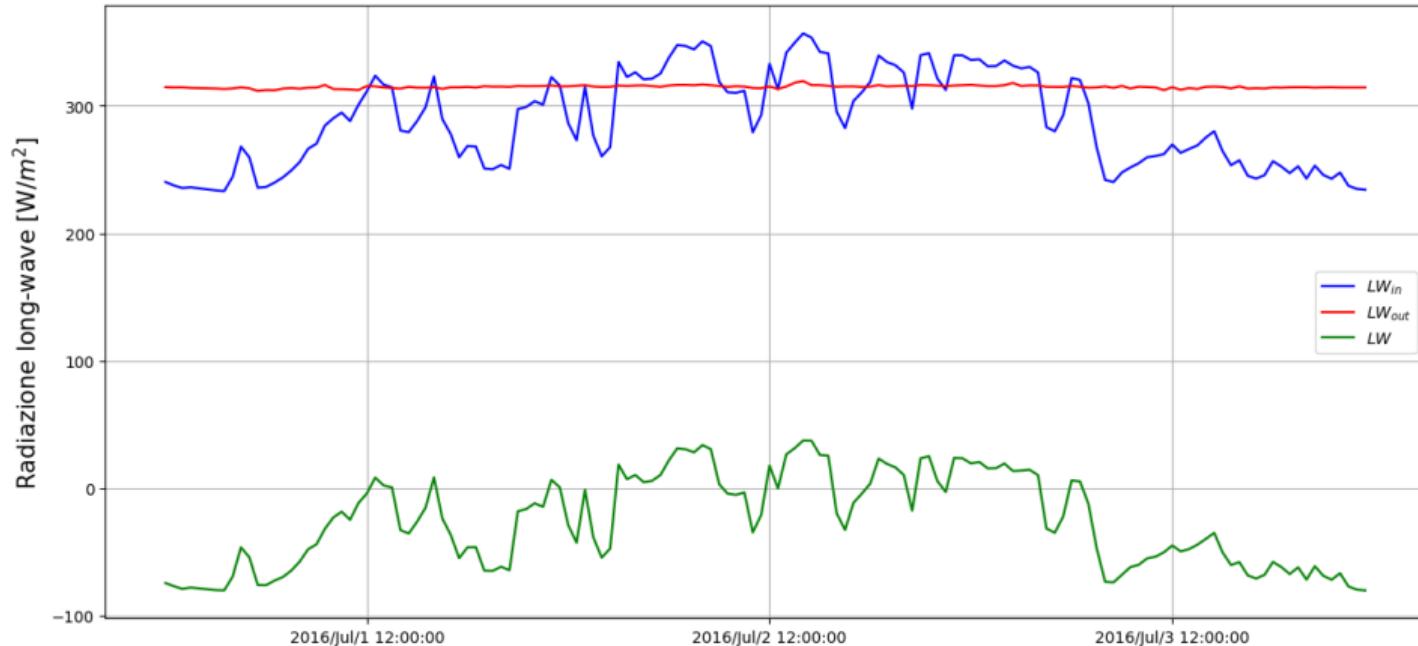
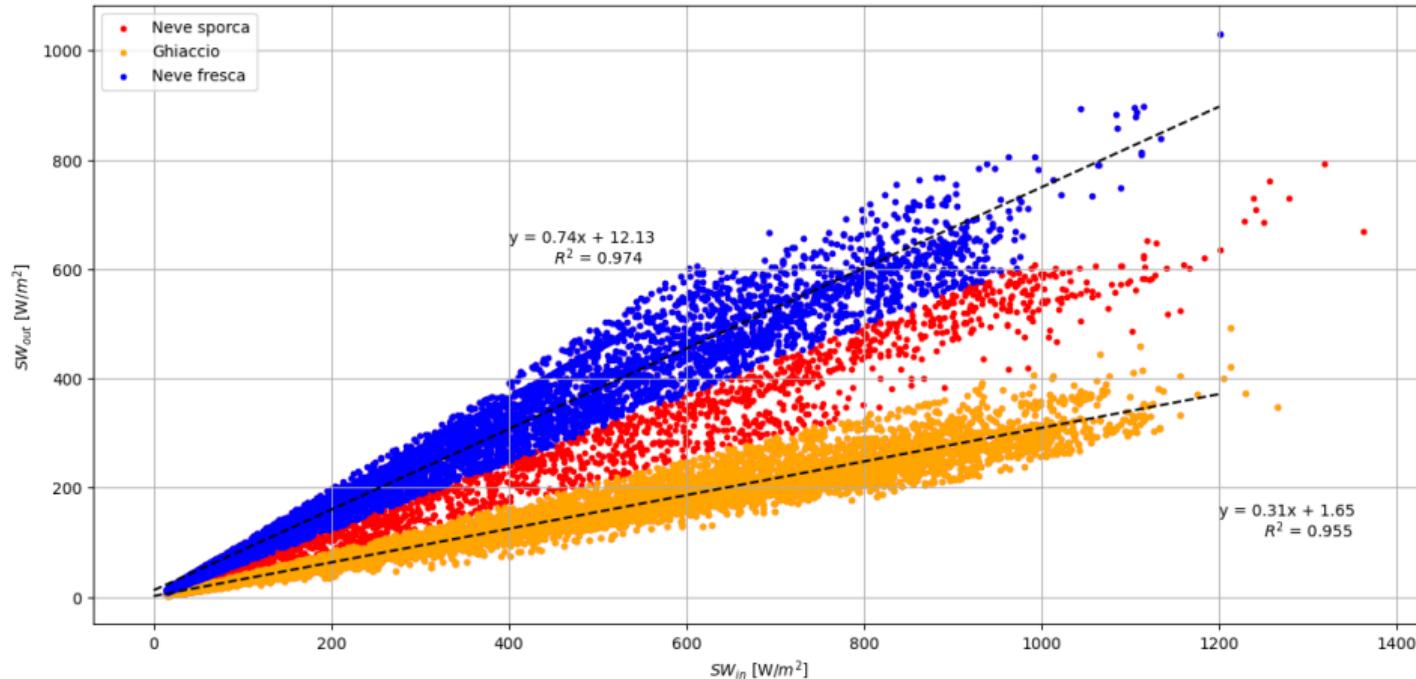


Figura: Dati da Oerlemans



# Albedo

## 5 Backup





# Temperatura

5 Backup

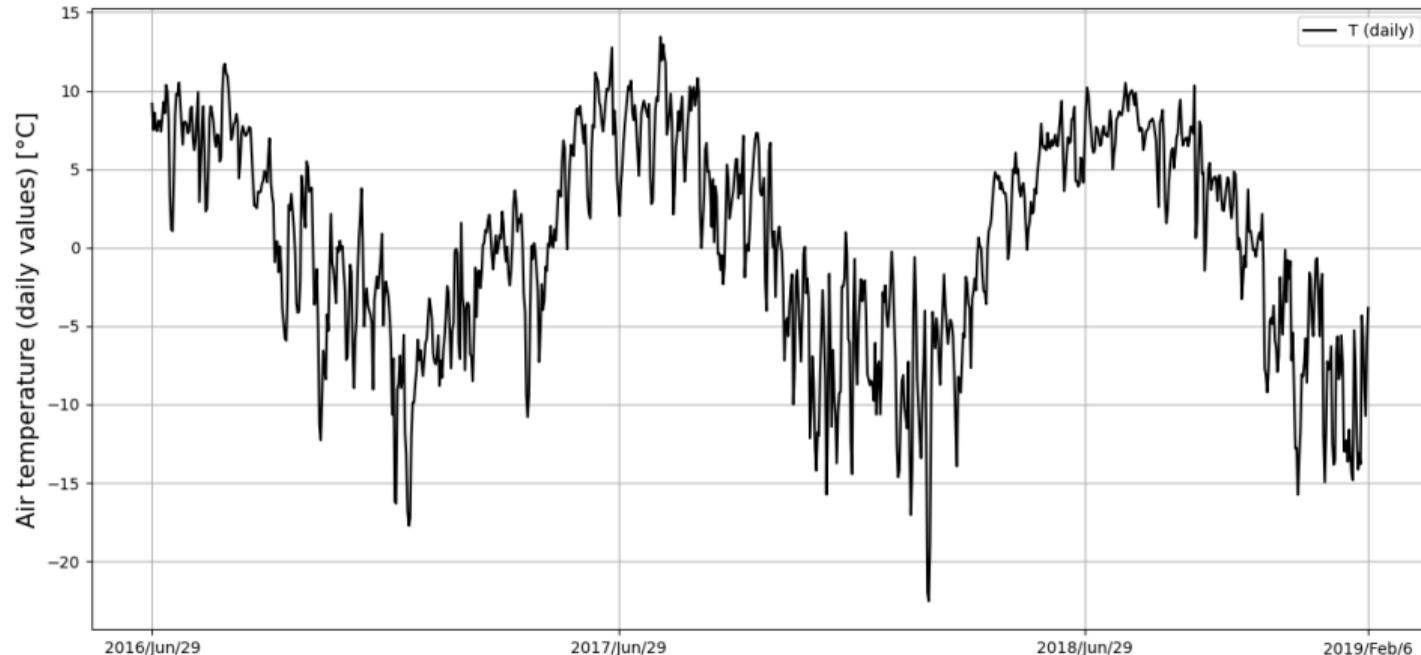


Figura: Dati da Oerlemans



# Temperatura superficiale

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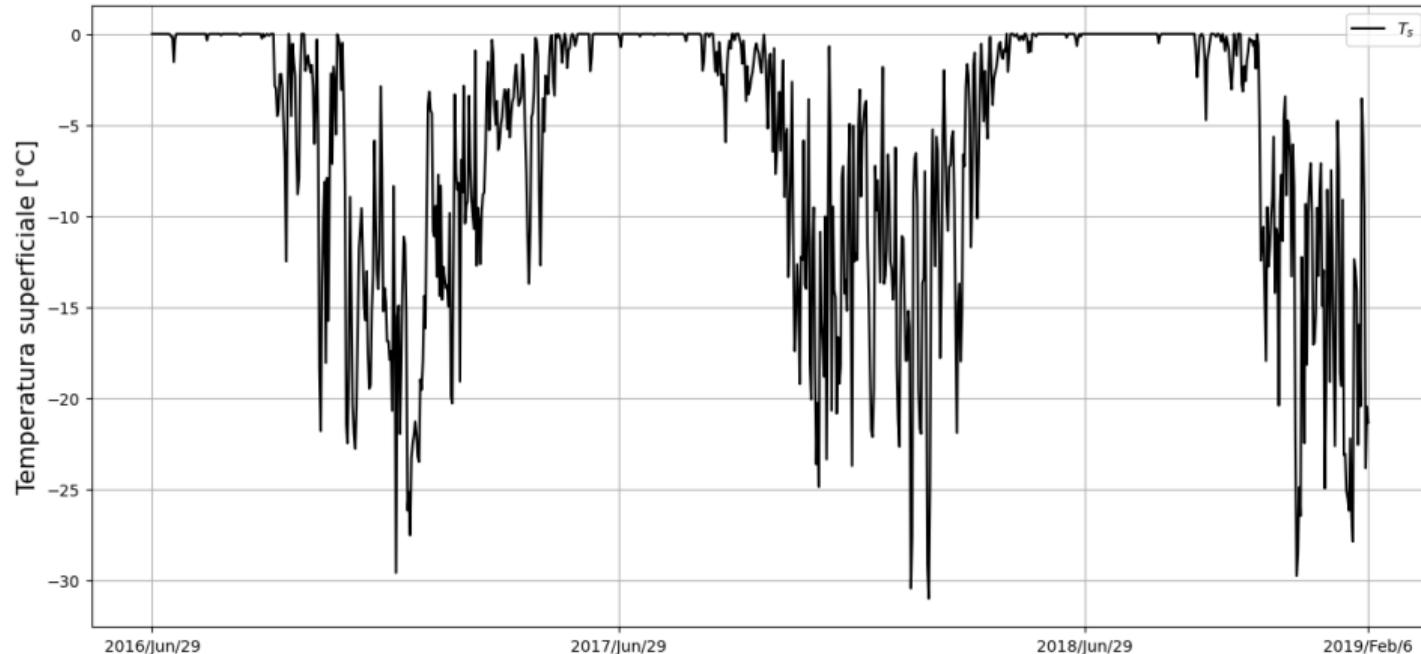
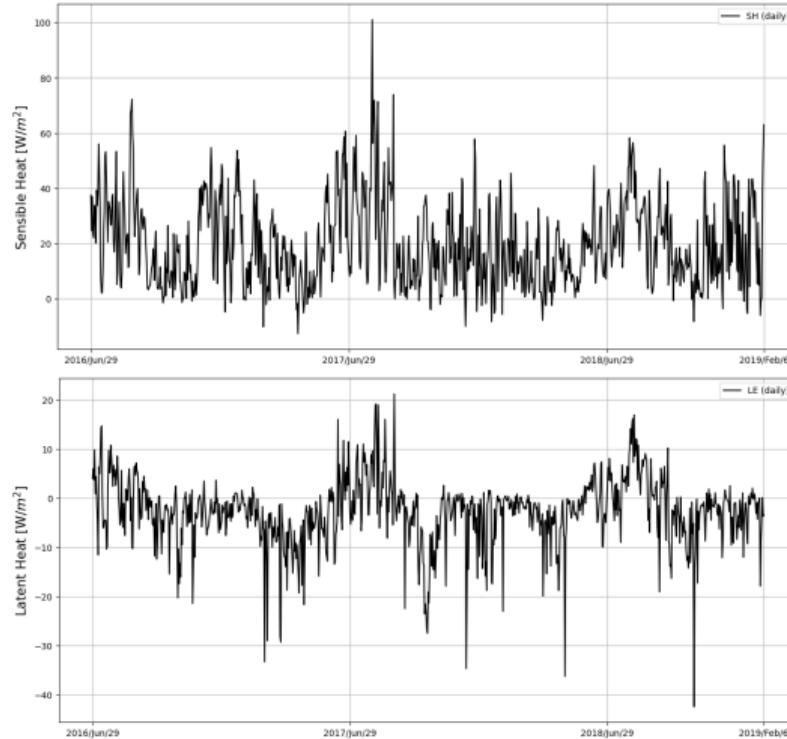


Figura: Dati da Oerlemans



# Sensible Heat e Latent Heat

## 5 Backup





## Secondo approccio: temperatura superficiale

5 Backup

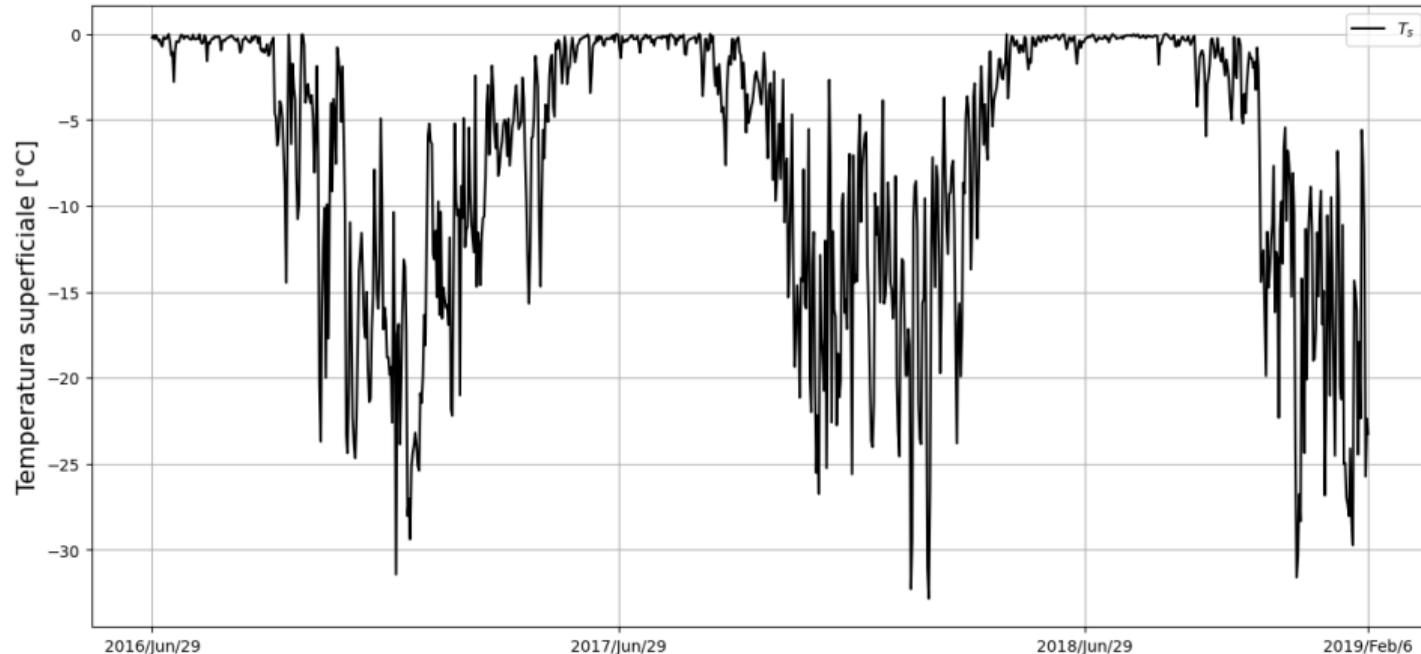
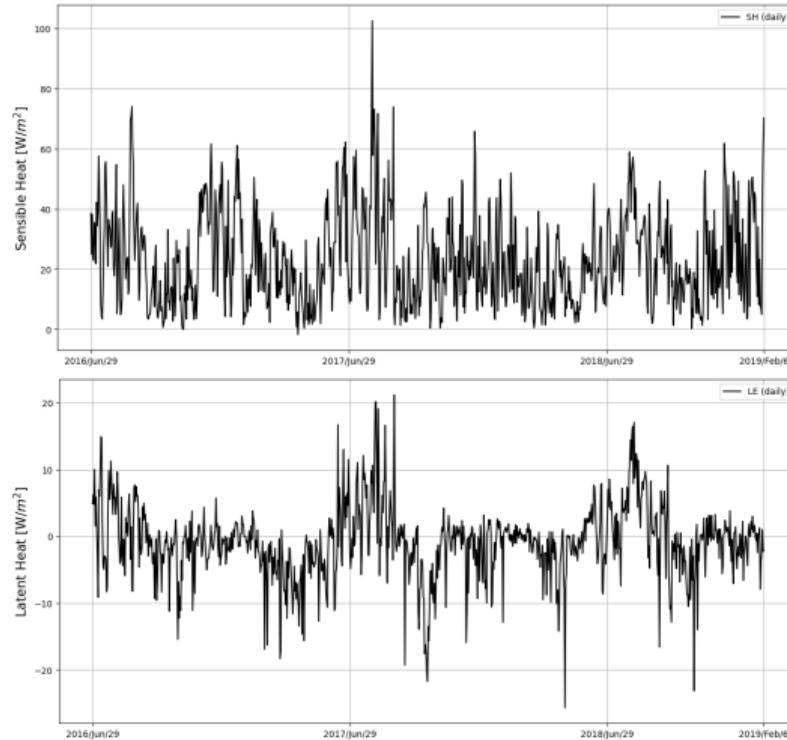


Figura: Dati da Oerlemans



# Secondo approccio: sensible e latent heat flux

## 5 Backup





## Secondo approccio: budget energetico

5 Backup

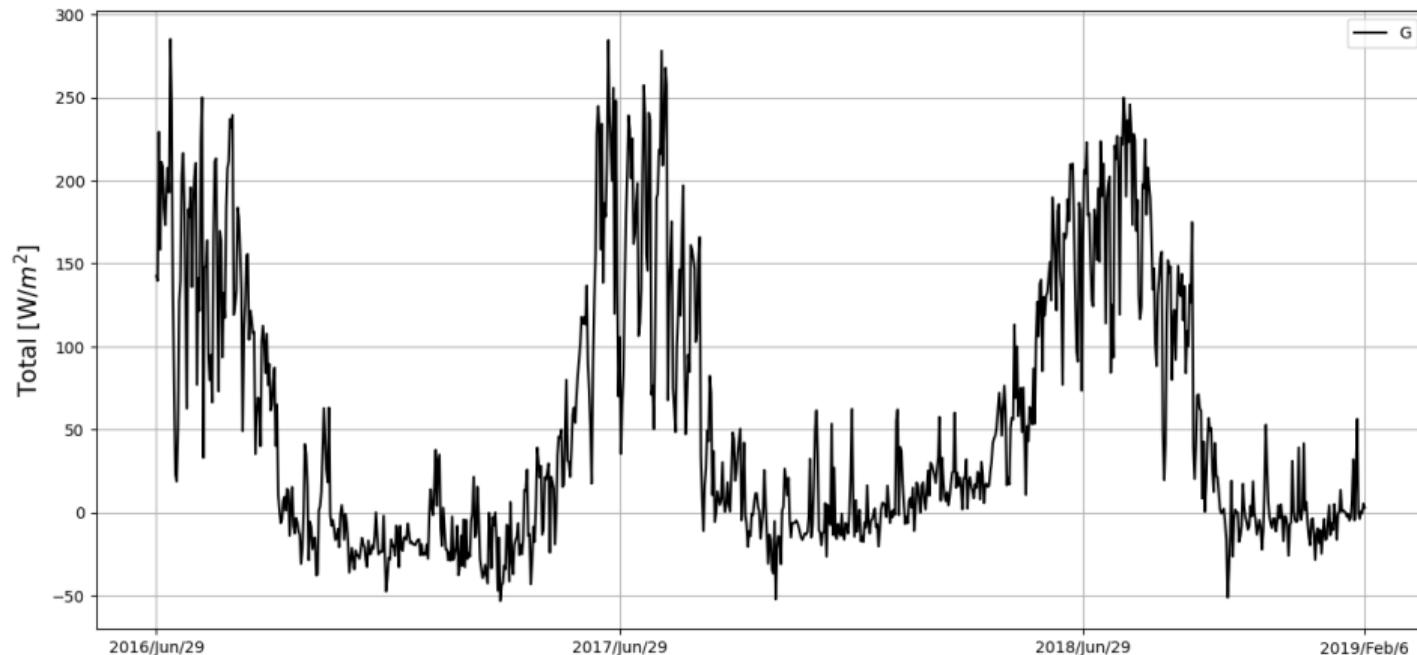


Figura: Dati da Oerlemans



## Secondo approccio: confronto fra modello e misurazioni

5 Backup

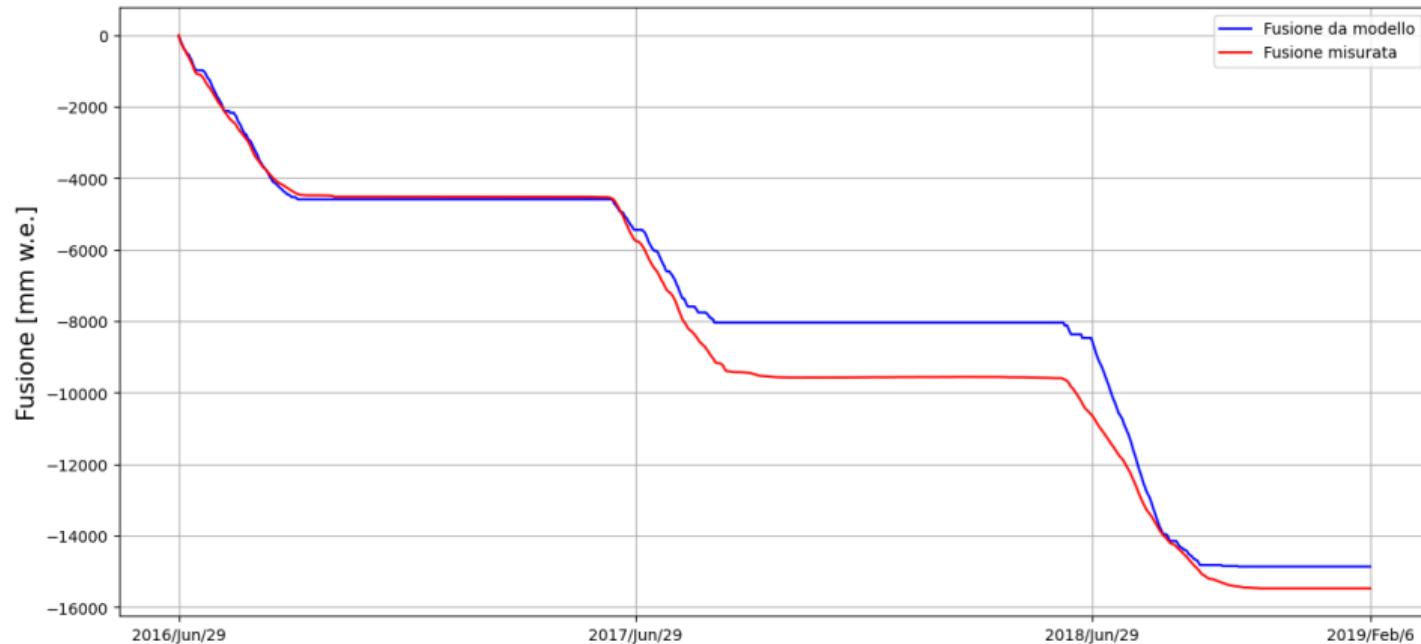


Figura: Dati da Oerlemans