



# **Meeting Generale progetto EEE**

**25-27/11/24, Roma, Centro Fermi**

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# Scelta dei telescopi

- Selezione dei telescopi funzionanti e operanti nello stesso lasso di tempo
- Diverse località per evidenziare un trend comune

| School                                   | Day             | Time  | Name of the last transferred File | Number of Files transferred today | Name of the last File analyzed by DQM | DQM daily report                          | RATE of Triggers for the last Run in DOM | RATE of Tracks for the last Run in DOM | Link DQM                |
|--|-----------------|-------|-----------------------------------|-----------------------------------|---------------------------------------|---|--|--|-------------------------|
| <b>PARM-01</b><br><i>[Event Display]</i> | mar 26 novembre | 11:46 | PARM-01-2024-11-26-00024.bin      | 25<br><i>[History]</i>            | PARM-01-2024-11-26-00023.bin          | <a href="#">26/11</a><br><i>[History]</i> | 27.0                                     | 22.0                                   | <a href="#">PARM-01</a> |
| <b>AREZ-01</b><br><i>[Event Display]</i> | mar 26 novembre | 11:24 | AREZ-01-2024-11-26-00019.bin      | 20<br><i>[History]</i>            | AREZ-01-2024-11-26-00019.bin          | <a href="#">26/11</a><br><i>[History]</i> | 21.0                                     | 18.0                                   | <a href="#">AREZ-01</a> |
| <b>TREV-01</b><br><i>[Event Display]</i> | mar 26 novembre | 11:30 | TREV-01-2024-11-26-00040.bin      | 41<br><i>[History]</i>            | TREV-01-2024-11-26-00039.bin          | <a href="#">25/11</a><br><i>[History]</i> | 47.0                                     | 43.0                                   | <a href="#">TREV-01</a> |
| <b>FERM-01</b><br><i>[Event Display]</i> | mar 26 novembre | 11:28 | FERM-01-2024-11-26-00029.bin      | 30<br><i>[History]</i>            | FERM-01-2024-11-26-00029.bin          | <a href="#">26/11</a><br><i>[History]</i> | 33.0                                     | 31.0                                   | <a href="#">FERM-01</a> |

# Procedimento

Sostituzione dei dati nelle colonne del Bin Start, RateHitEvents e Pressure del tutorial con quelli dei telescopi scelti

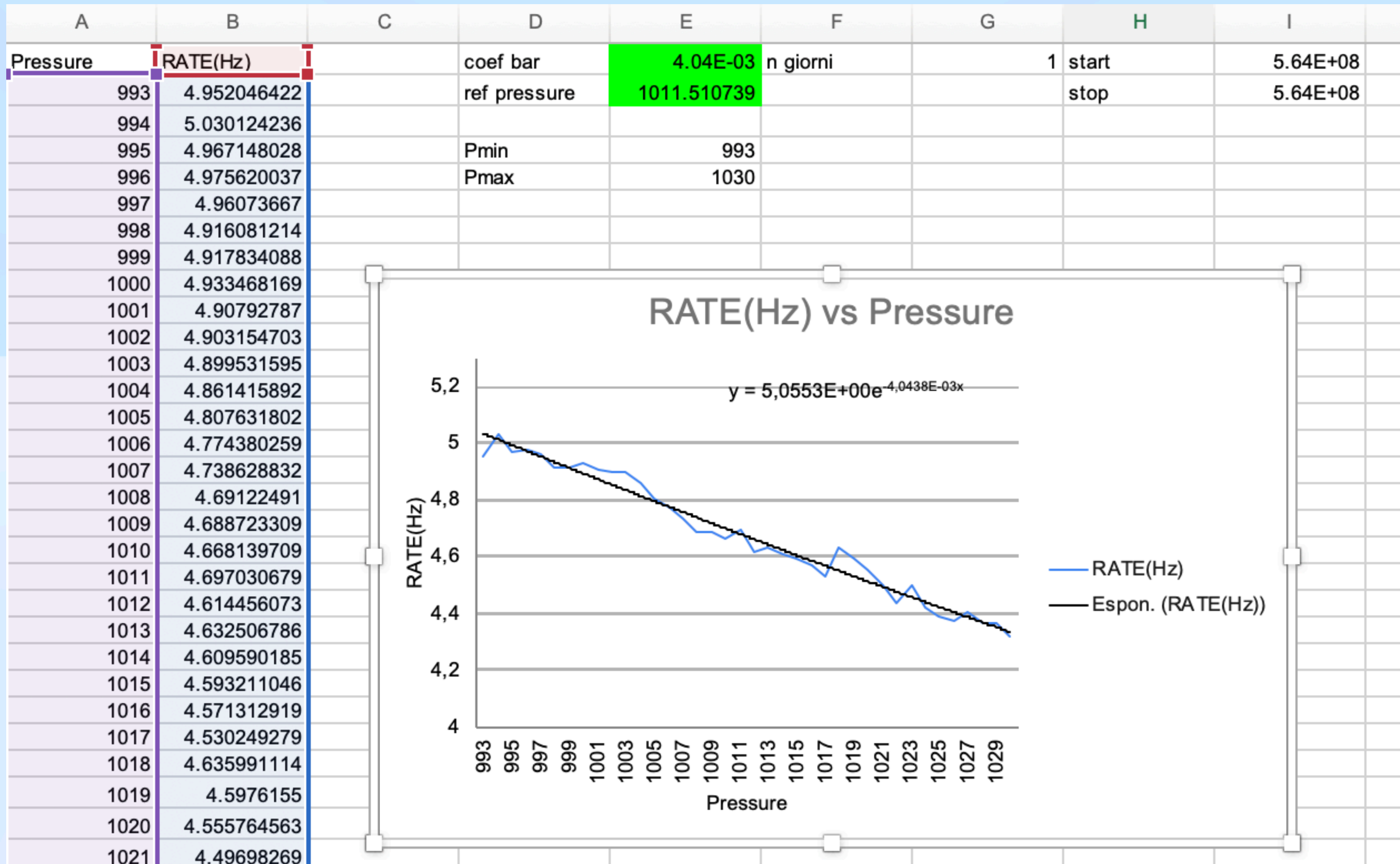
| #BinStart | Date          | RateHitEvents | Pressure | Rate Corr |
|-----------|---------------|---------------|----------|-----------|
| 5.46E+08  | 15/4/24 22.12 | 5.44E+01      | 9.98E+02 | 5.21E+01  |
| 5.46E+08  | 15/4/24 22.13 | 5.32E+01      | 9.98E+02 | 5.09E+01  |
| 5.46E+08  | 15/4/24 22.14 | 5.54E+01      | 9.98E+02 | 5.30E+01  |
| 5.46E+08  | 15/4/24 22.15 | 5.45E+01      | 9.98E+02 | 5.21E+01  |
| 5.46E+08  | 15/4/24 22.16 | 5.54E+01      | 9.98E+02 | 5.30E+01  |
| 5.46E+08  | 15/4/24 22.17 | 5.56E+01      | 9.98E+02 | 5.32E+01  |
| 5.46E+08  | 15/4/24 22.19 | 5.36E+01      | 9.98E+02 | 5.13E+01  |
| 5.46E+08  | 15/4/24 22.20 | 5.39E+01      | 9.98E+02 | 5.16E+01  |
| 5.46E+08  | 15/4/24 22.21 | 5.47E+01      | 9.98E+02 | 5.24E+01  |
| 5.46E+08  | 15/4/24 22.22 | 5.54E+01      | 9.98E+02 | 5.30E+01  |
| 5.46E+08  | 15/4/24 22.23 | 5.55E+01      | 9.98E+02 | 5.31E+01  |
| 5.46E+08  | 15/4/24 22.24 | 5.53E+01      | 9.98E+02 | 5.30E+01  |
| 5.46E+08  | 15/4/24 22.25 | 5.55E+01      | 9.98E+02 | 5.31E+01  |
| 5.46E+08  | 15/4/24 22.26 | 5.38E+01      | 9.98E+02 | 5.15E+01  |
| 5.46E+08  | 15/4/24 22.27 | 5.35E+01      | 9.98E+02 | 5.12E+01  |
| 5.46E+08  | 15/4/24 22.28 | 5.41E+01      | 9.98E+02 | 5.18E+01  |
| 5.46E+08  | 15/4/24 22.29 | 5.55E+01      | 9.98E+02 | 5.31E+01  |
| 5.46E+08  | 15/4/24 22.30 | 5.36E+01      | 9.98E+02 | 5.13E+01  |
| 5.46E+08  | 15/4/24 22.31 | 5.39E+01      | 9.98E+02 | 5.15E+01  |



| #BinStart | Date          | RateHitEvents | Pressure | Rate Corr |
|-----------|---------------|---------------|----------|-----------|
| 5.64E+08  | 16/11/24 0.07 | 2.53E+01      | 1.02E+03 | 2.75E+01  |
| 5.64E+08  | 16/11/24 0.08 | 2.50E+01      | 1.02E+03 | 2.73E+01  |
| 5.64E+08  | 16/11/24 0.09 | 2.50E+01      | 1.02E+03 | 2.72E+01  |
| 5.64E+08  | 16/11/24 0.10 | 2.62E+01      | 1.02E+03 | 2.86E+01  |
| 5.64E+08  | 16/11/24 0.11 | 2.57E+01      | 1.02E+03 | 2.80E+01  |
| 5.64E+08  | 16/11/24 0.12 | 2.67E+01      | 1.02E+03 | 2.91E+01  |
| 5.64E+08  | 16/11/24 0.13 | 2.48E+01      | 1.02E+03 | 2.70E+01  |
| 5.64E+08  | 16/11/24 0.14 | 2.54E+01      | 1.02E+03 | 2.77E+01  |
| 5.64E+08  | 16/11/24 0.15 | 2.52E+01      | 1.02E+03 | 2.75E+01  |
| 5.64E+08  | 16/11/24 0.16 | 2.58E+01      | 1.02E+03 | 2.81E+01  |
| 5.64E+08  | 16/11/24 0.17 | 2.60E+01      | 1.02E+03 | 2.83E+01  |
| 5.64E+08  | 16/11/24 0.18 | 2.51E+01      | 1.02E+03 | 2.73E+01  |
| 5.64E+08  | 16/11/24 0.19 | 2.53E+01      | 1.02E+03 | 2.75E+01  |
| 5.64E+08  | 16/11/24 0.20 | 2.51E+01      | 1.02E+03 | 2.73E+01  |
| 5.64E+08  | 16/11/24 0.21 | 2.60E+01      | 1.02E+03 | 2.84E+01  |
| 5.64E+08  | 16/11/24 0.22 | 2.58E+01      | 1.02E+03 | 2.81E+01  |
| 5.64E+08  | 16/11/24 0.23 | 2.44E+01      | 1.02E+03 | 2.66E+01  |
| 5.64E+08  | 16/11/24 0.24 | 2.58E+01      | 1.02E+03 | 2.81E+01  |
| 5.64E+08  | 16/11/24 0.25 | 2.63E+01      | 1.02E+03 | 2.87E+01  |

# Procedimento

## Creazione del grafico Rate vs Pressure e individuazione del coefficiente

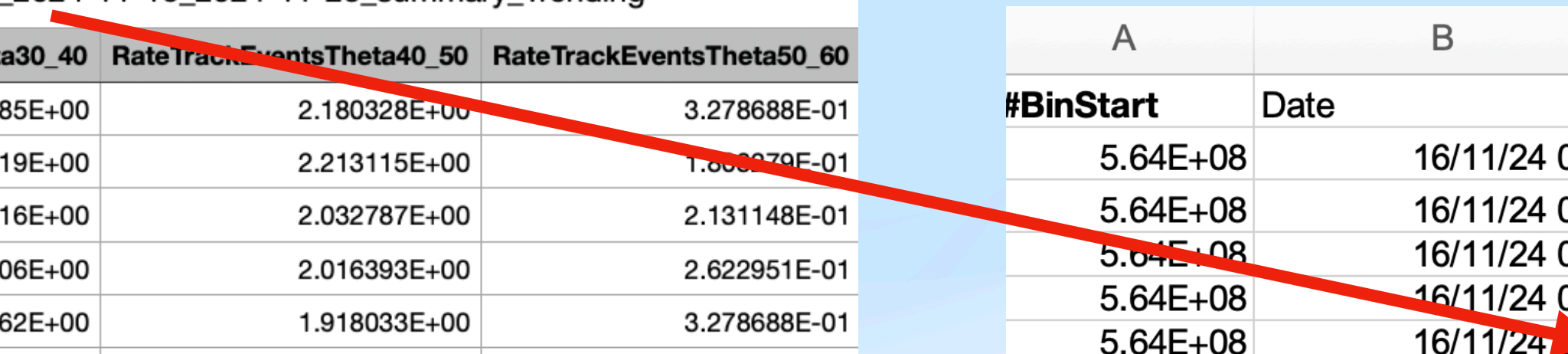


# Il criterio preso in esame

Rate eventi con tracce ricostruite per definite direzioni (valori di theta)

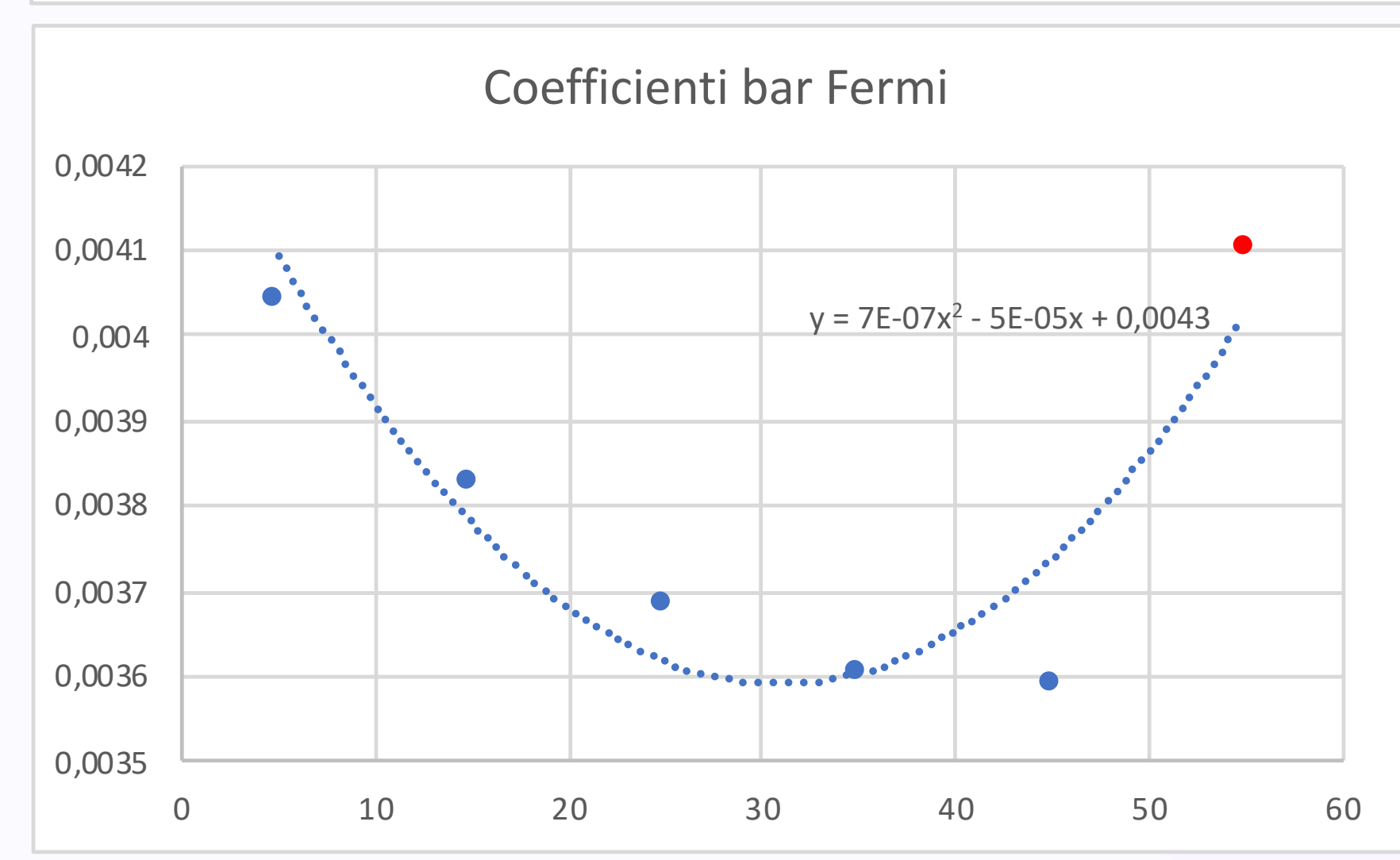
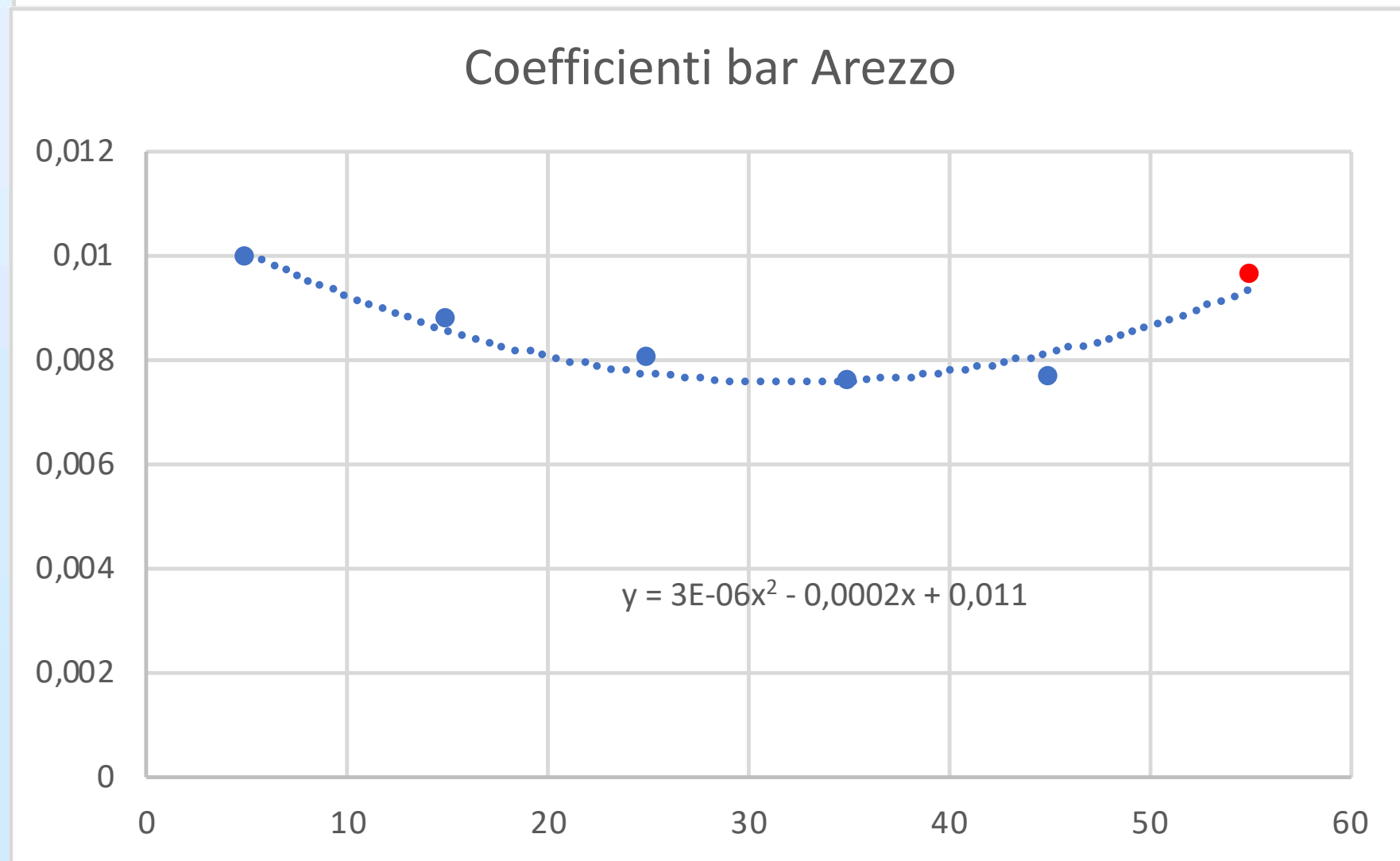
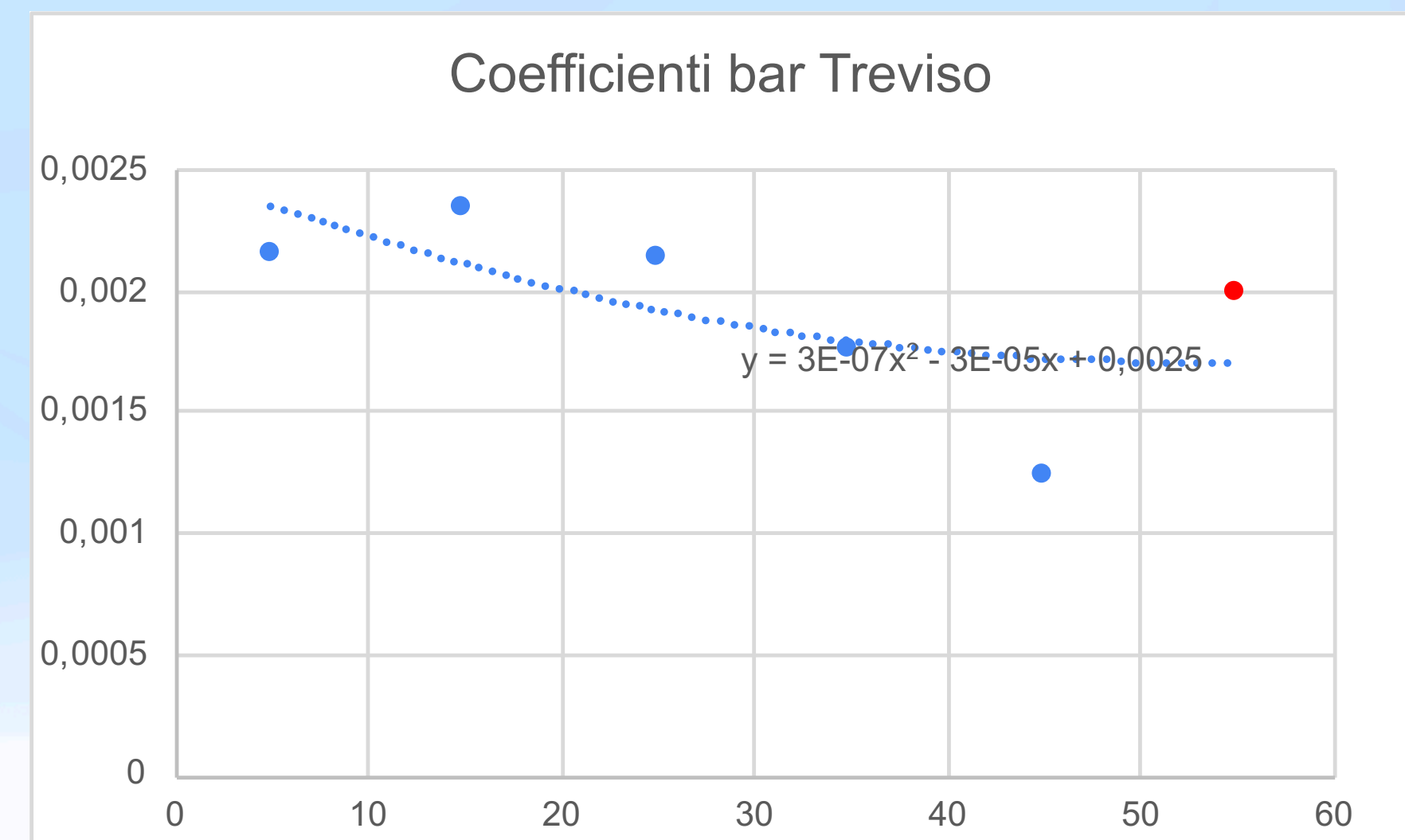
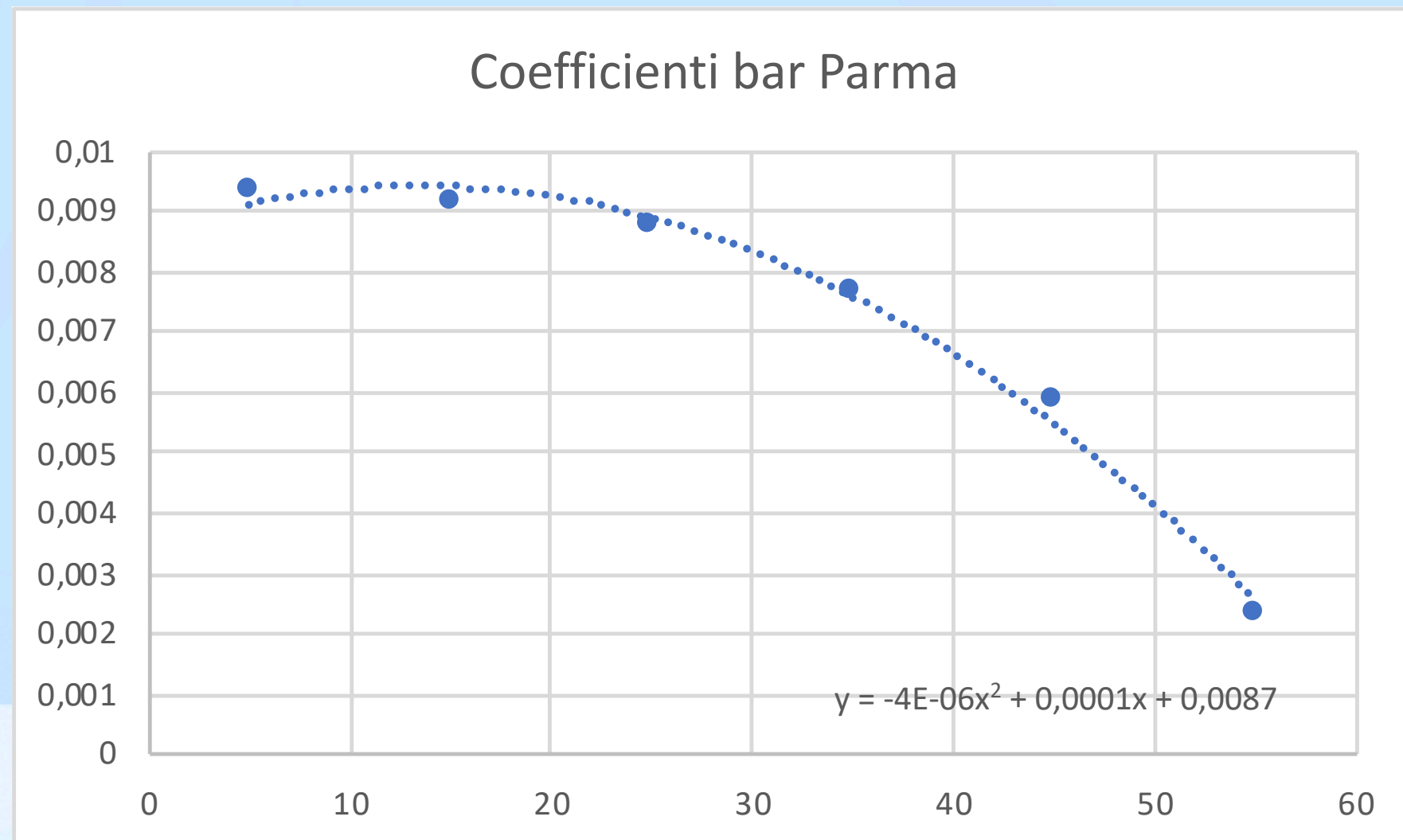
| FERM-01_2024-11-16_2024-11-25_summary_Trending |                           |                           |                           |                           |                           |
|--|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| RateTrackEventsTheta0_10                       | RateTrackEventsTheta10_20 | RateTrackEventsTheta20_30 | RateTrackEventsTheta30_40 | RateTrackEventsTheta40_50 | RateTrackEventsTheta50_60 |
| 4.786885E+00                                   | 9.147541E+00              | 9.016394E+00              | 5.786885E+00              | 2.180328E+00              | 3.278688E-01              |
| 4.360656E+00                                   | 8.573771E+00              | 9.147541E+00              | 5.950819E+00              | 2.213115E+00              | 1.600979E-01              |
| 4.819672E+00                                   | 8.95082E+00               | 9.655738E+00              | 5.459016E+00              | 2.032787E+00              | 2.131148E-01              |
| 4.459016E+00                                   | 9.04918E+00               | 9.131147E+00              | 5.983606E+00              | 2.016393E+00              | 2.622951E-01              |
| 4.557377E+00                                   | 9.327868E+00              | 9.295082E+00              | 6.344262E+00              | 1.918033E+00              | 3.278688E-01              |
| 4.327869E+00                                   | 9.311476E+00              | 9.114754E+00              | 6.229508E+00              | 2.04918E+00               | 2.295082E-01              |
| 4.47541E+00                                    | 9.278688E+00              | 9.065574E+00              | 5.983606E+00              | 2.213115E+00              | 2.786885E-01              |
| 4.655738E+00                                   | 9.295082E+00              | 9.196721E+00              | 6.278688E+00              | 1.819672E+00              | 2.622951E-01              |
| 4.852459E+00                                   | 9.016394E+00              | 9.278688E+00              | 5.836066E+00              | 2.147541E+00              | 2.131148E-01              |
| 4.590164E+00                                   | 8.459017E+00              | 9.47541E+00               | 6.278688E+00              | 2.098361E+00              | 3.606557E-01              |
| 4.950819E+00                                   | 9.442623E+00              | 9.360656E+00              | 5.704918E+00              | 1.754098E+00              | 2.622951E-01              |
| 4.459016E+00                                   | 8.409836E+00              | 9.557377E+00              | 6.049181E+00              | 1.983607E+00              | 2.622951E-01              |
| 4.213115E+00                                   | 8.836065E+00              | 9.491803E+00              | 6.377049E+00              | 2.065574E+00              | 3.606557E-01              |
| 4.754098E+00                                   | 8.327868E+00              | 9.196721E+00              | 6.295082E+00              | 1.918033E+00              | 2.95082E-01               |
| 4.557377E+00                                   | 8.573771E+00              | 9.114754E+00              | 6E+00                     | 2.163934E+00              | 3.770492E-01              |
| 4.311475E+00                                   | 8.606558E+00              | 1.011475E+01              | 6.245902E+00              | 2.491803E+00              | 2.622951E-01              |
| 4.557377E+00                                   | 8.737705E+00              | 9.508197E+00              | 5.901639E+00              | 1.983607E+00              | 2.295082E-01              |
| 5.065574E+00                                   | 8.655738E+00              | 9.311476E+00              | 6.081967E+00              | 1.95082E+00               | 1.639344E-01              |
| 4.52459E+00                                    | 8.754098E+00              | 9E+00                     | 6.295082E+00              | 1.95082E+00               | 3.114754E-01              |
| 4.360656E+00                                   | 9.032787E+00              | 9.540983E+00              | 6.032787E+00              | 2.360656E+00              | 2.95082E-01               |
| 4.426229E+00                                   | 9.327868E+00              | 9.786885E+00              | 5.606557E+00              | 1.967213E+00              | 2.459016E-01              |

| A         | B             | C             | D        | E         |
|-----------|---------------|---------------|----------|-----------|
| #BinStart | Date          | RateTrackEver | Pressure | Rate Corr |
| 5.64E+08  | 16/11/24 0.00 | 4.79E+00      | 1.02E+03 | 4.87E+00  |
| 5.64E+08  | 16/11/24 0.01 | 4.36E+00      | 1.02E+03 | 4.44E+00  |
| 5.64E+08  | 16/11/24 0.02 | 4.82E+00      | 1.02E+03 | 4.91E+00  |
| 5.64E+08  | 16/11/24 0.03 | 4.46E+00      | 1.02E+03 | 4.54E+00  |
| 5.64E+08  | 16/11/24 0.04 | 4.56E+00      | 1.02E+03 | 4.64E+00  |
| 5.64E+08  | 16/11/24 0.05 | 4.33E+00      | 1.02E+03 | 4.41E+00  |
| 5.64E+08  | 16/11/24 0.06 | 4.48E+00      | 1.02E+03 | 4.56E+00  |
| 5.64E+08  | 16/11/24 0.07 | 4.66E+00      | 1.02E+03 | 4.74E+00  |
| 5.64E+08  | 16/11/24 0.08 | 4.85E+00      | 1.02E+03 | 4.94E+00  |
| 5.64E+08  | 16/11/24 0.09 | 4.59E+00      | 1.02E+03 | 4.67E+00  |
| 5.64E+08  | 16/11/24 0.10 | 4.95E+00      | 1.02E+03 | 5.04E+00  |
| 5.64E+08  | 16/11/24 0.11 | 4.46E+00      | 1.02E+03 | 4.54E+00  |
| 5.64E+08  | 16/11/24 0.12 | 4.21E+00      | 1.02E+03 | 4.29E+00  |
| 5.64E+08  | 16/11/24 0.13 | 4.75E+00      | 1.02E+03 | 4.84E+00  |
| 5.64E+08  | 16/11/24 0.14 | 4.56E+00      | 1.02E+03 | 4.64E+00  |
| 5.64E+08  | 16/11/24 0.15 | 4.31E+00      | 1.02E+03 | 4.39E+00  |
| 5.64E+08  | 16/11/24 0.16 | 4.56E+00      | 1.02E+03 | 4.64E+00  |
| 5.64E+08  | 16/11/24 0.17 | 5.07E+00      | 1.02E+03 | 5.16E+00  |
| 5.64E+08  | 16/11/24 0.18 | 4.52E+00      | 1.02E+03 | 4.61E+00  |



# Scopo del progetto

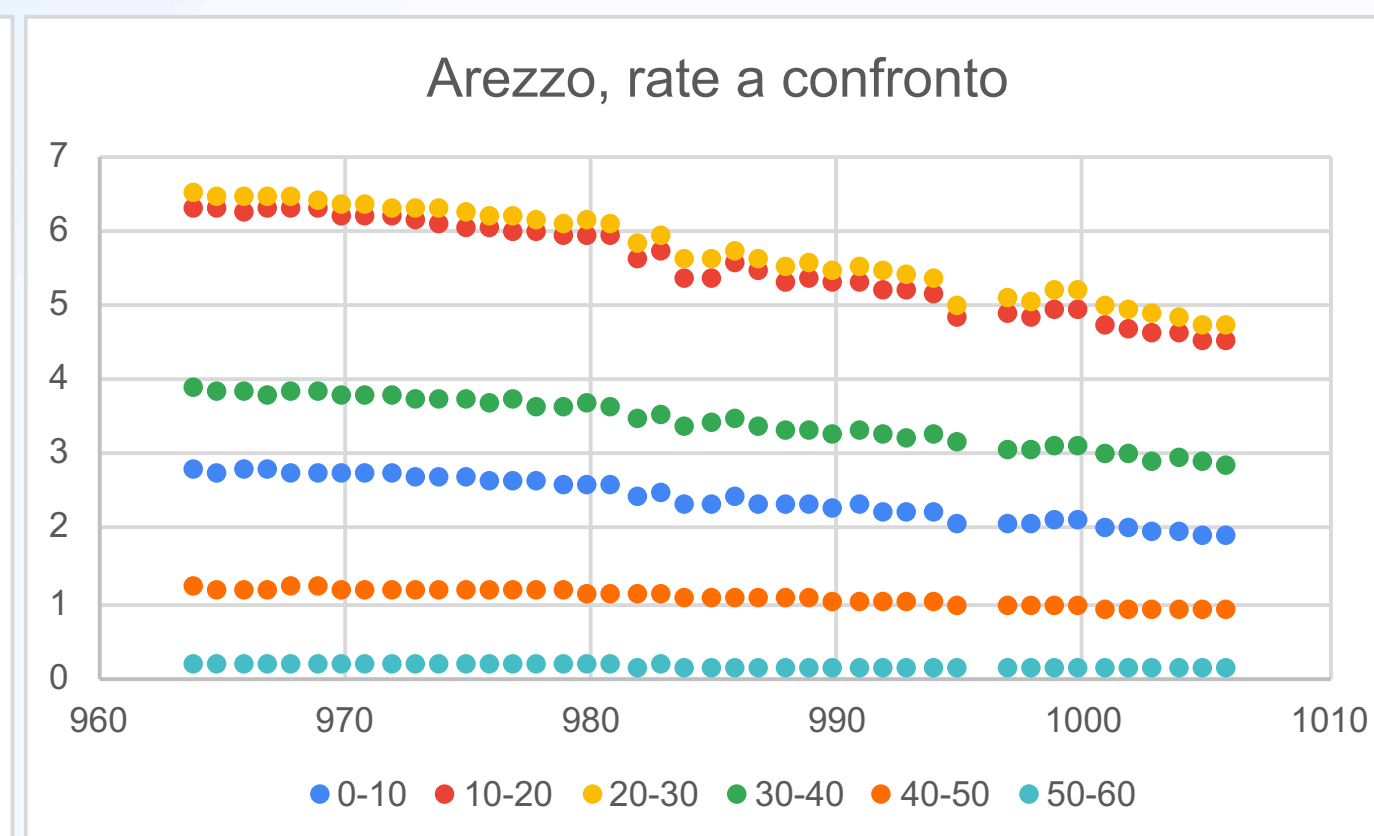
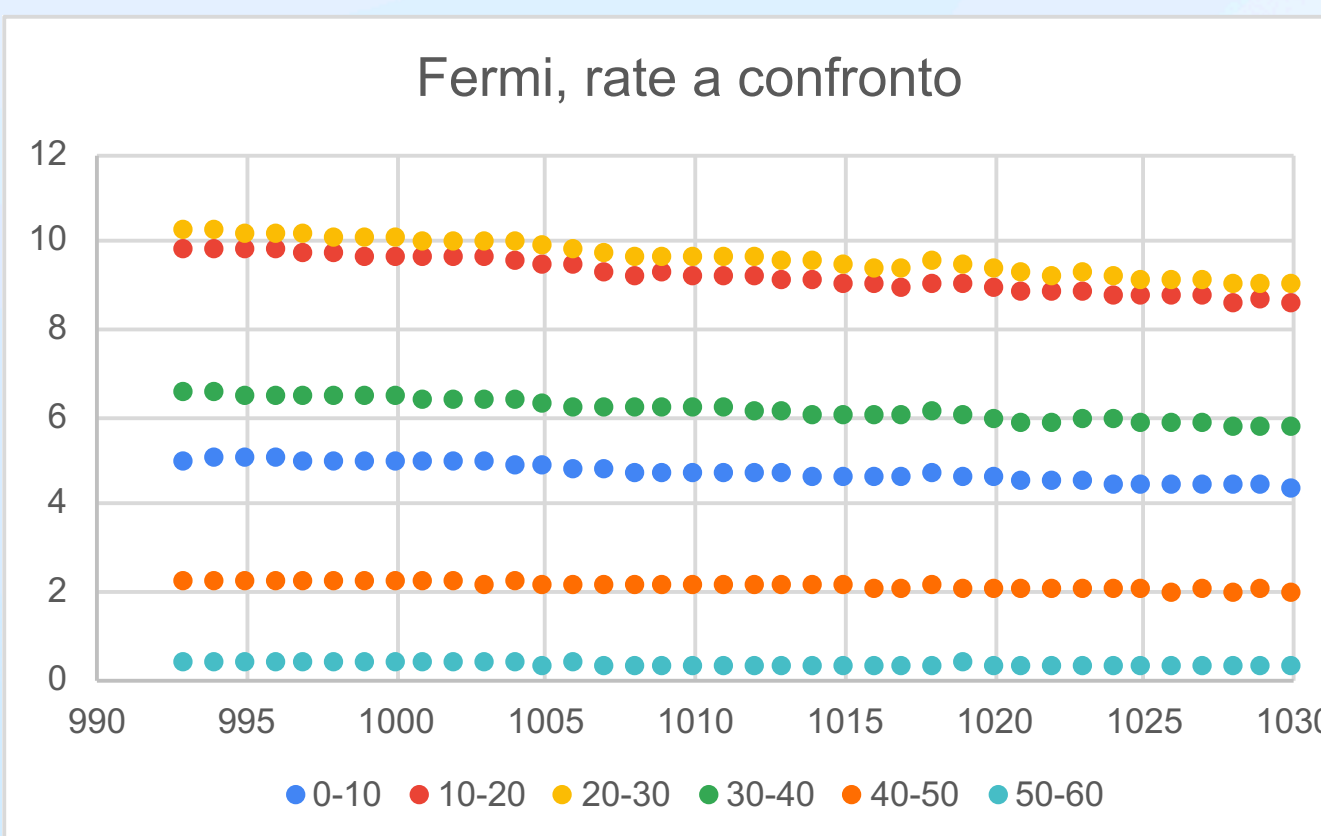
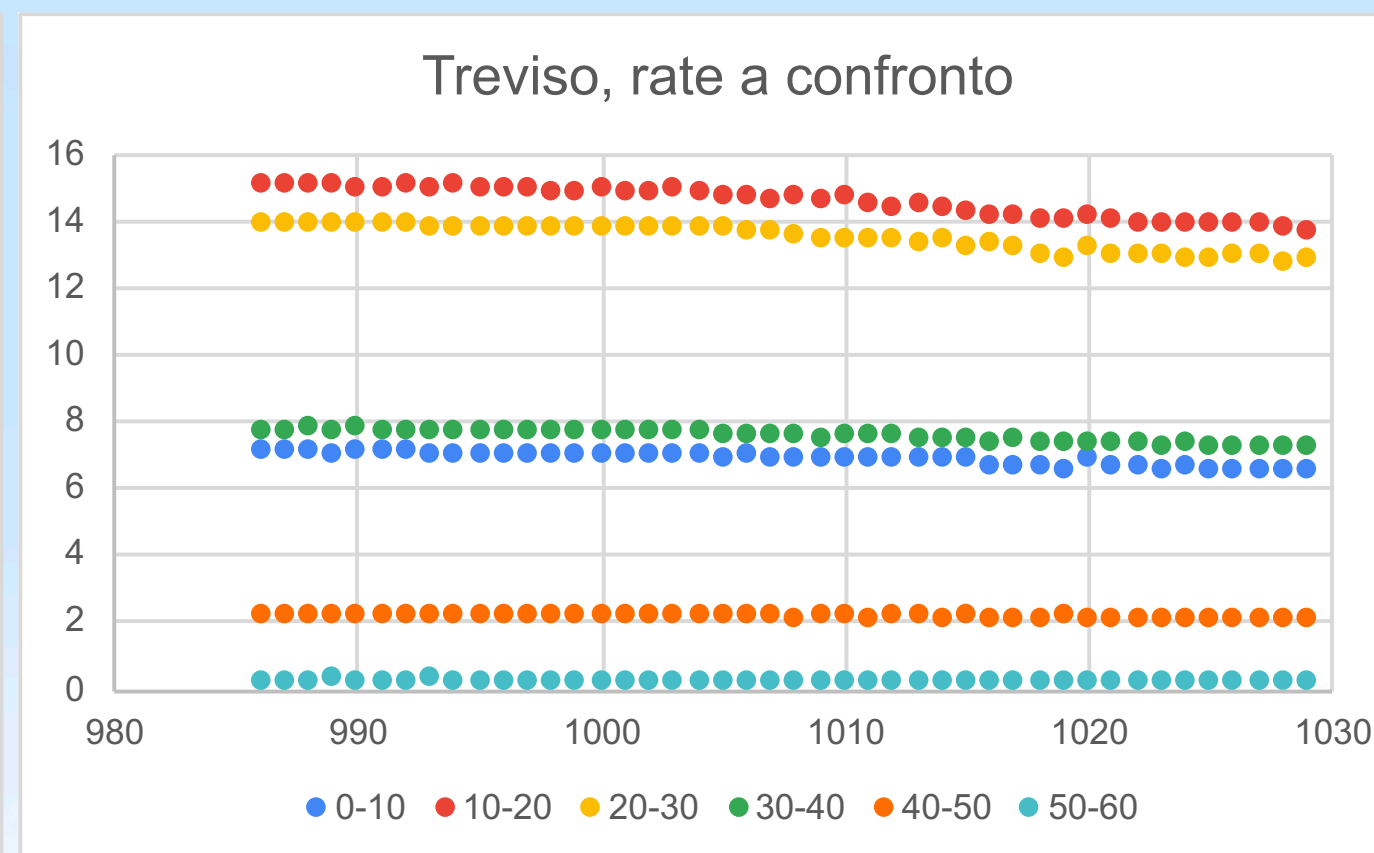
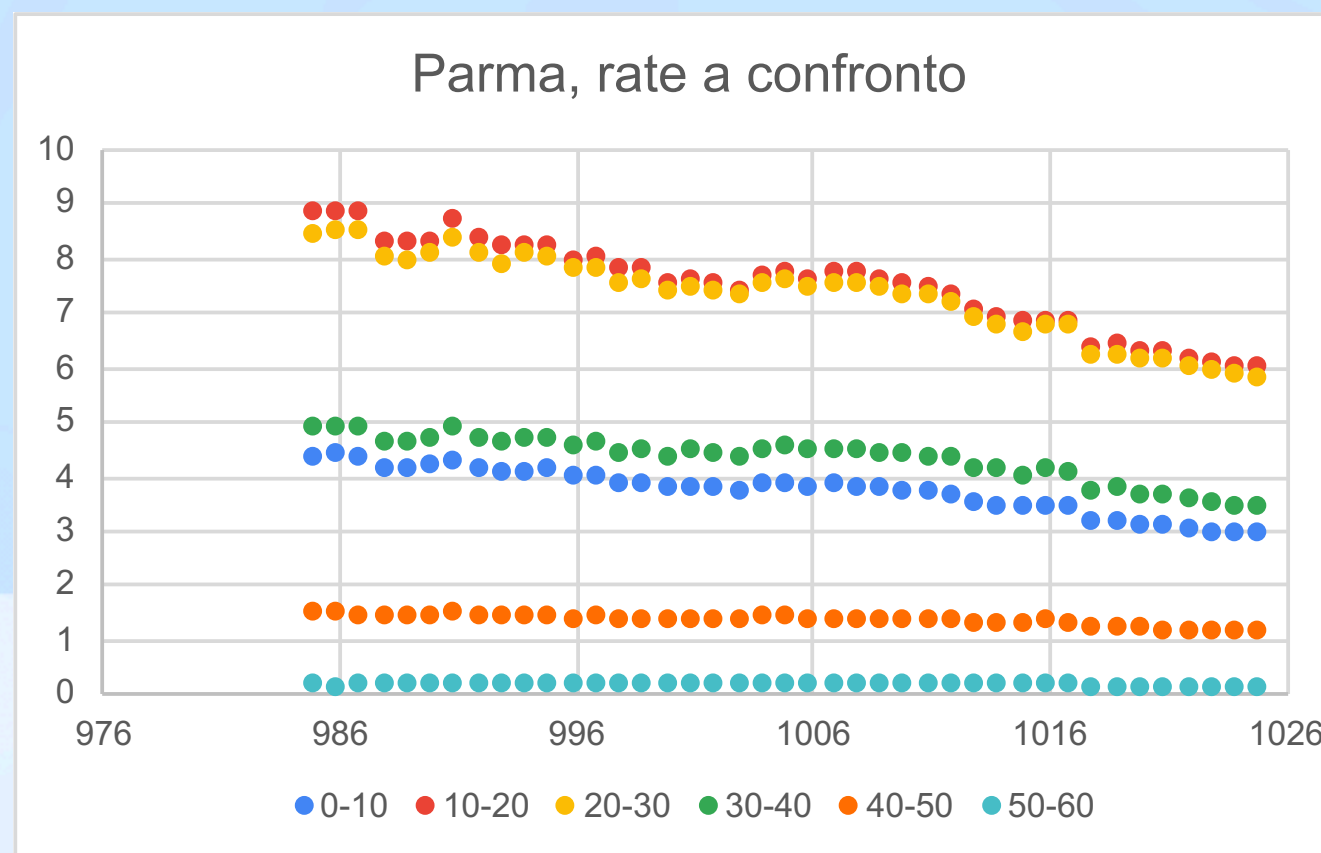
Trend decrescente del coefficiente barometrico, comune ad ogni località



# Eccezioni e possibili motivazioni

-Nel caso degli angoli theta fra  $40^\circ$  e  $50^\circ$  o  $50^\circ$  e  $60^\circ$ , il coefficiente in alcuni casi ha mostrato un picco improvviso ed inatteso, creando una piccola anomalia.

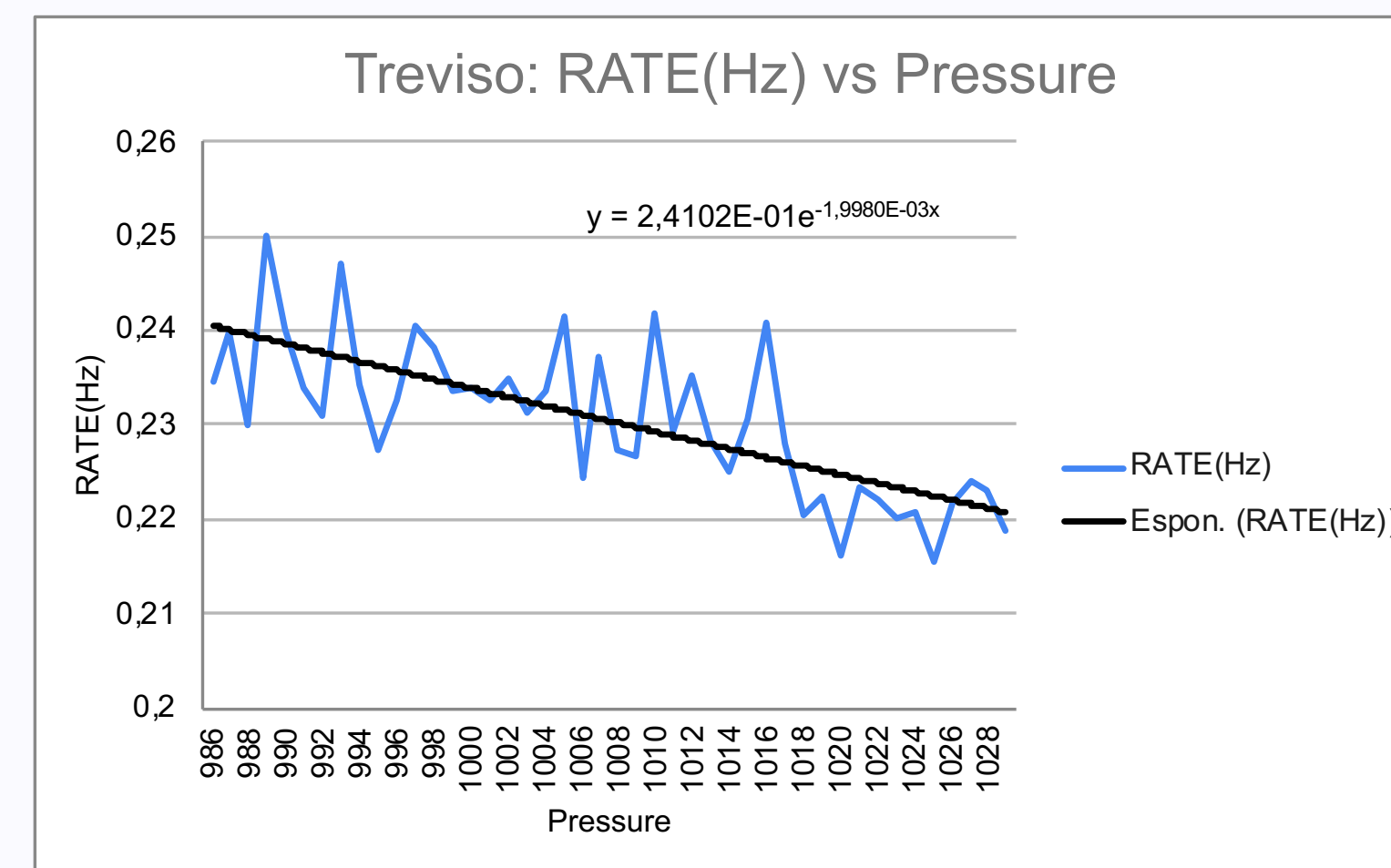
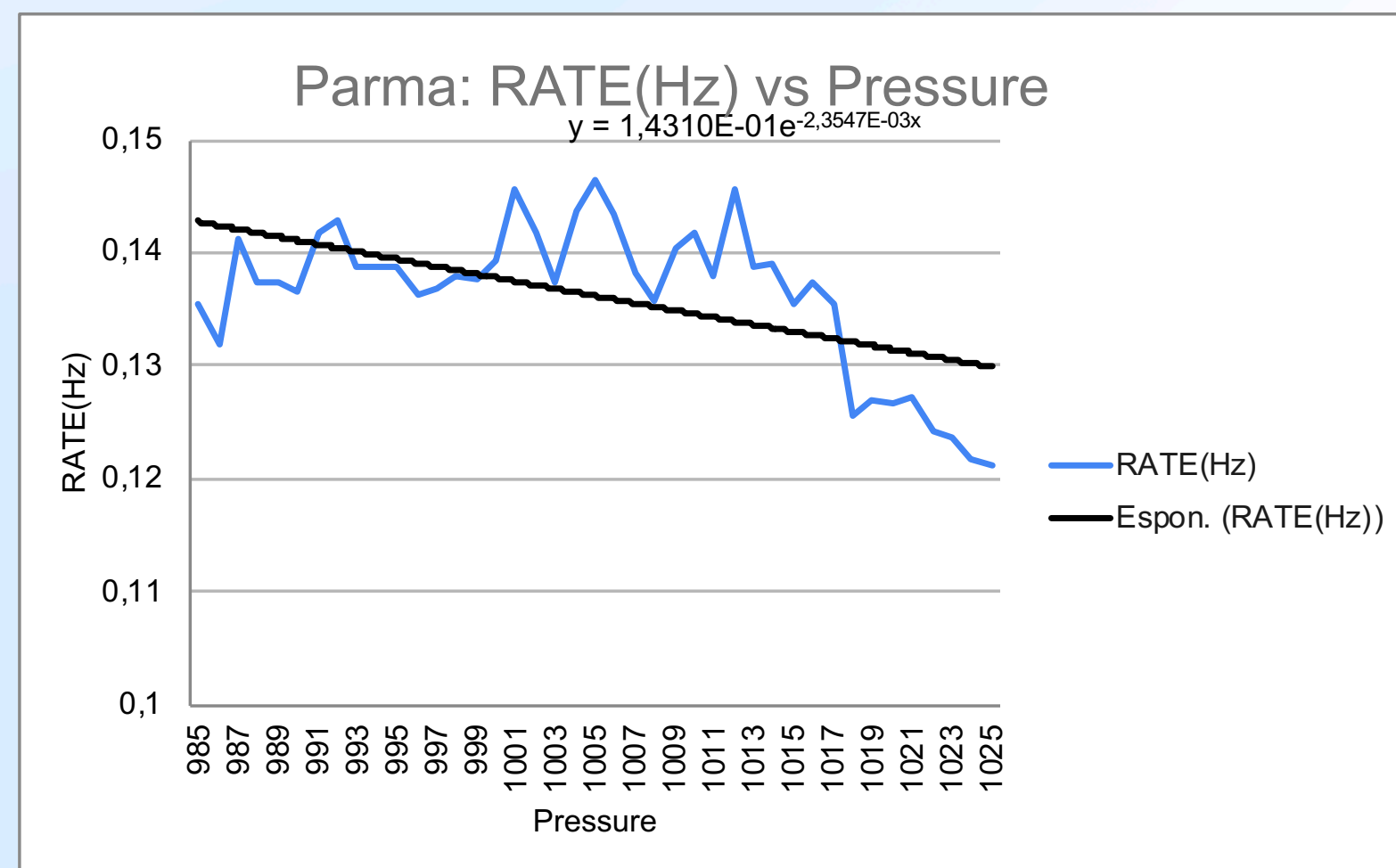
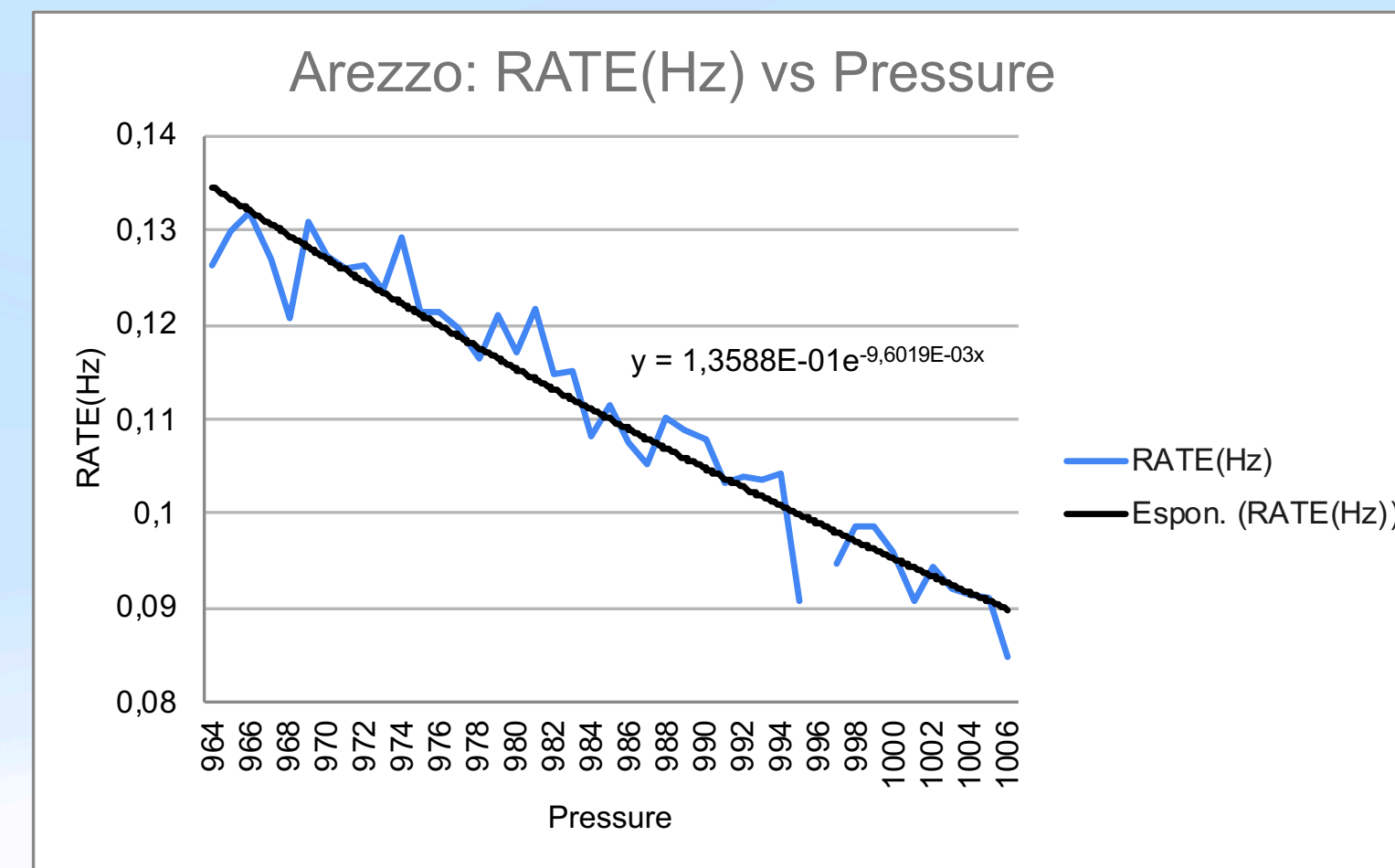
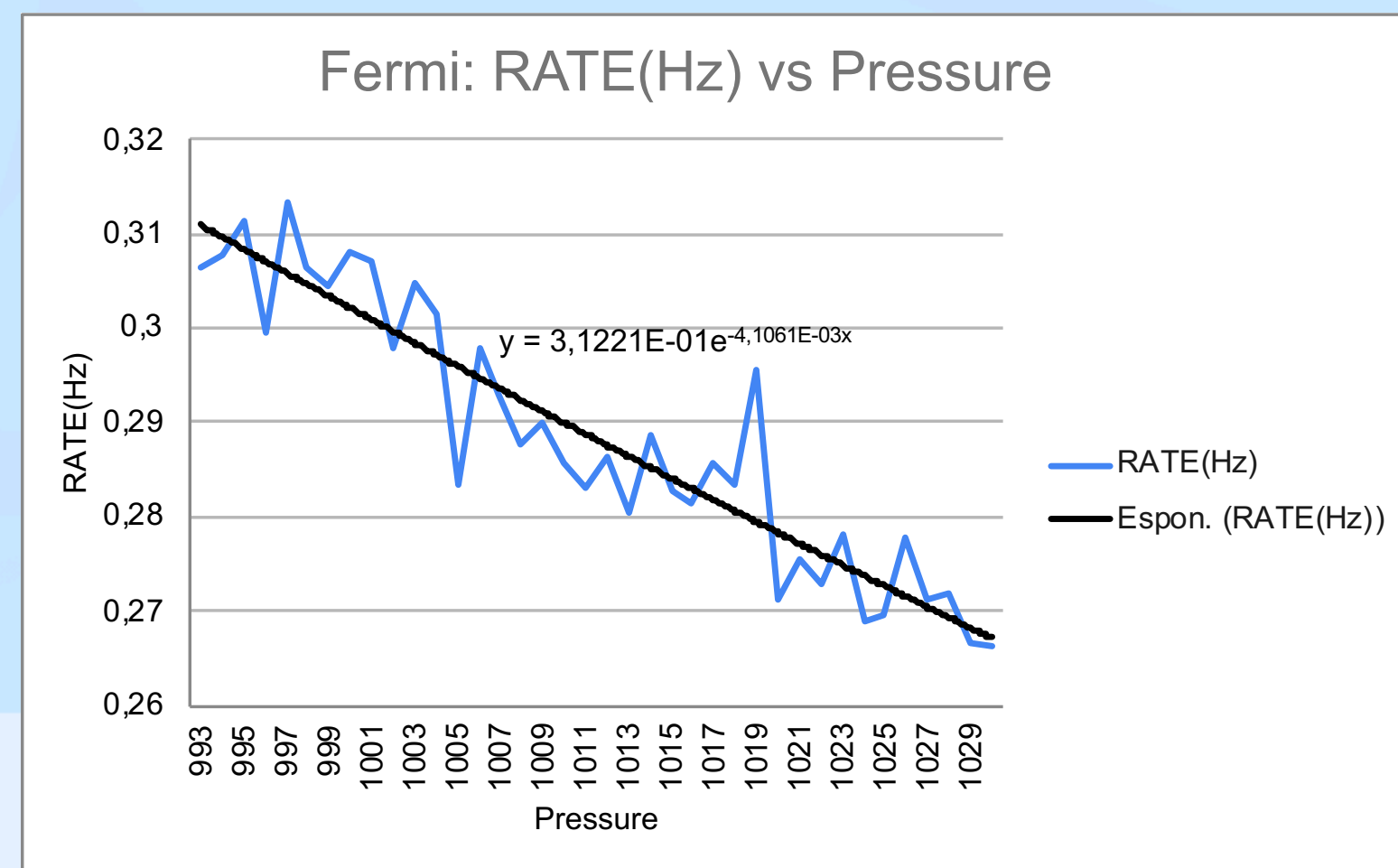
Abbiamo ricercato la motivazione partendo dai rate corrispondenti agli stessi angoli theta...



**Picco** del rate in corrispondenza degli angoli fra  $10^\circ$  e  $30^\circ$  mentre la fascia fra  $40^\circ$  e  $60^\circ$  ha un rate visibilmente inferiore.

# Eccezioni e possibili motivazioni

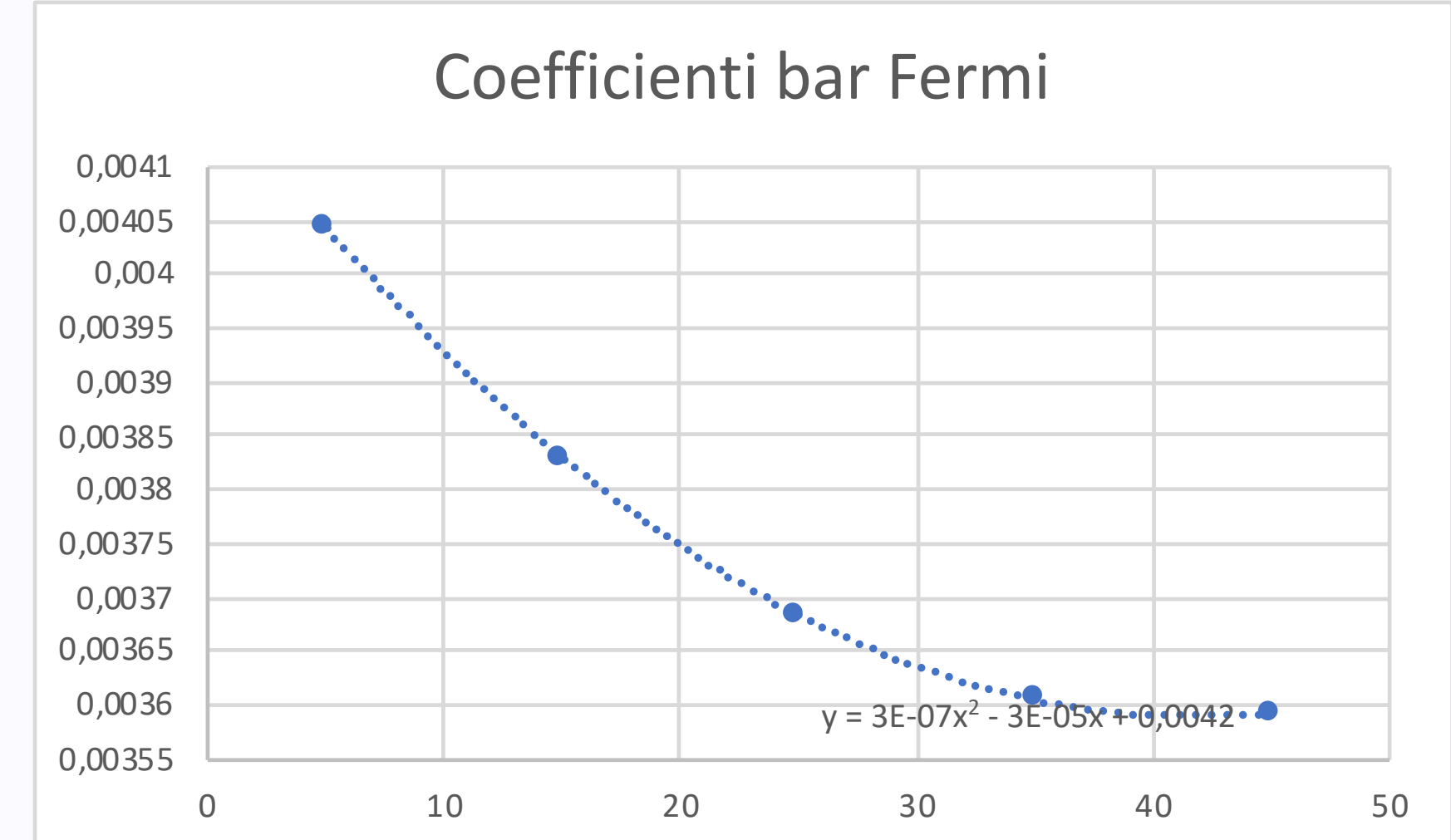
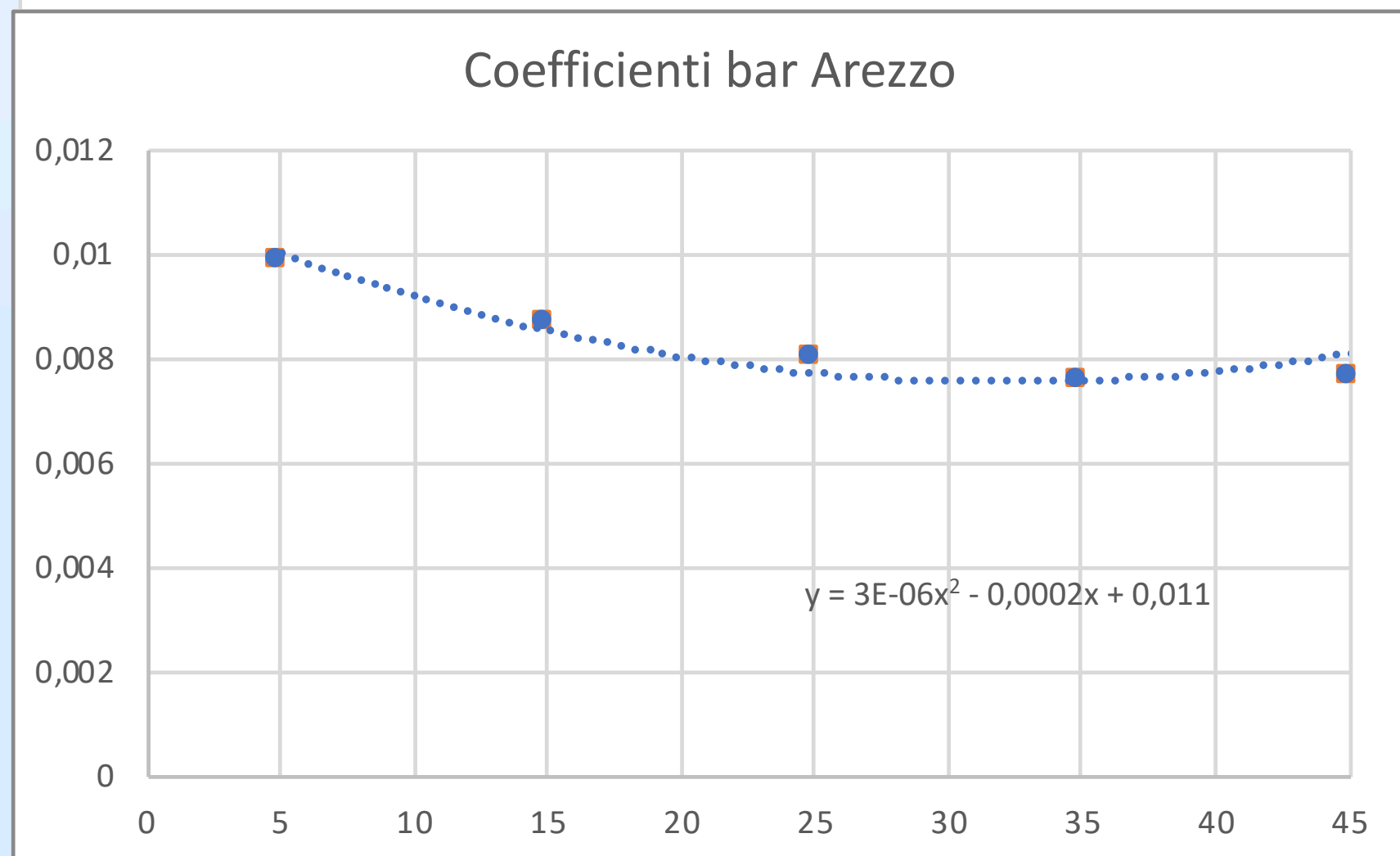
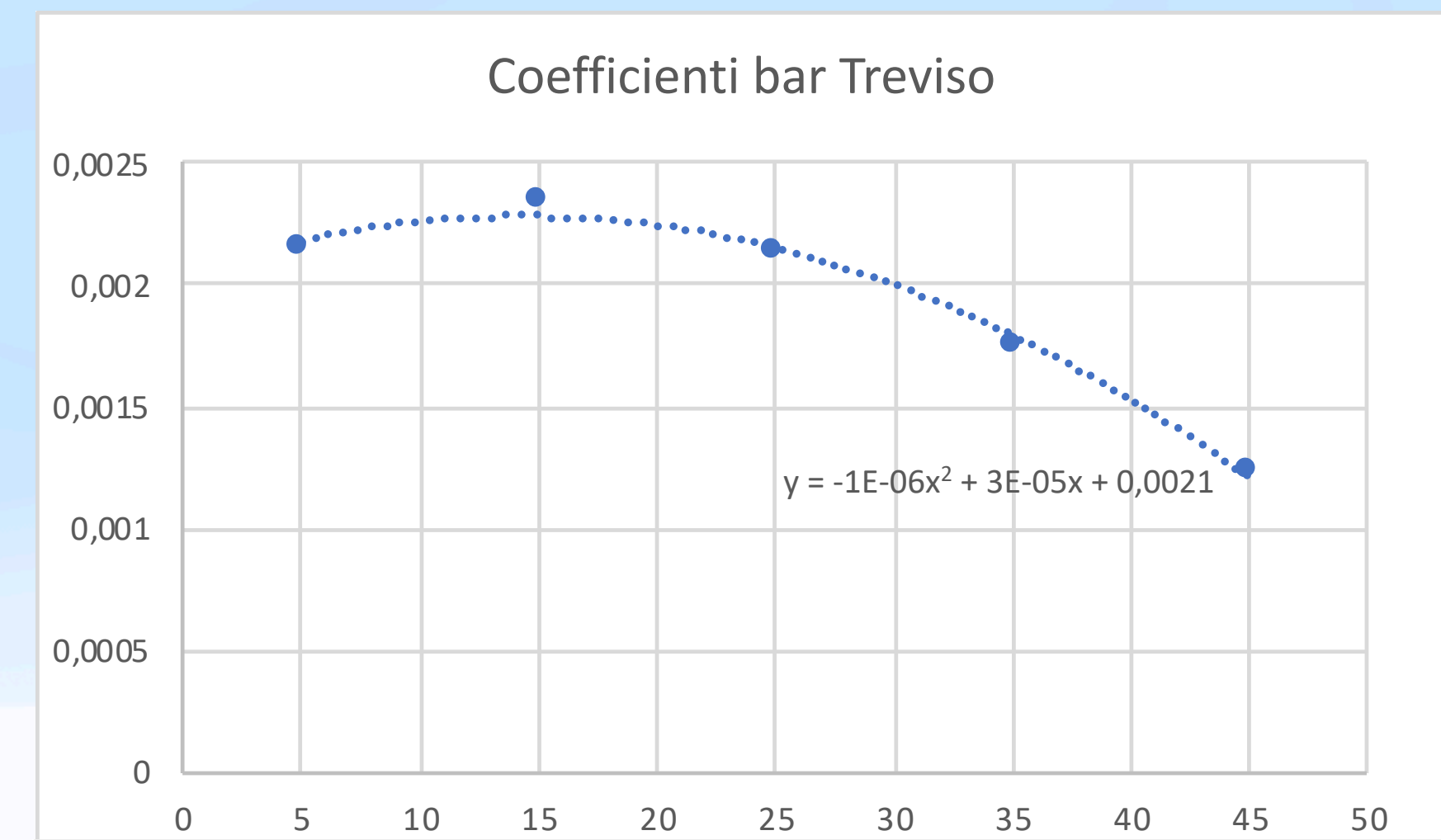
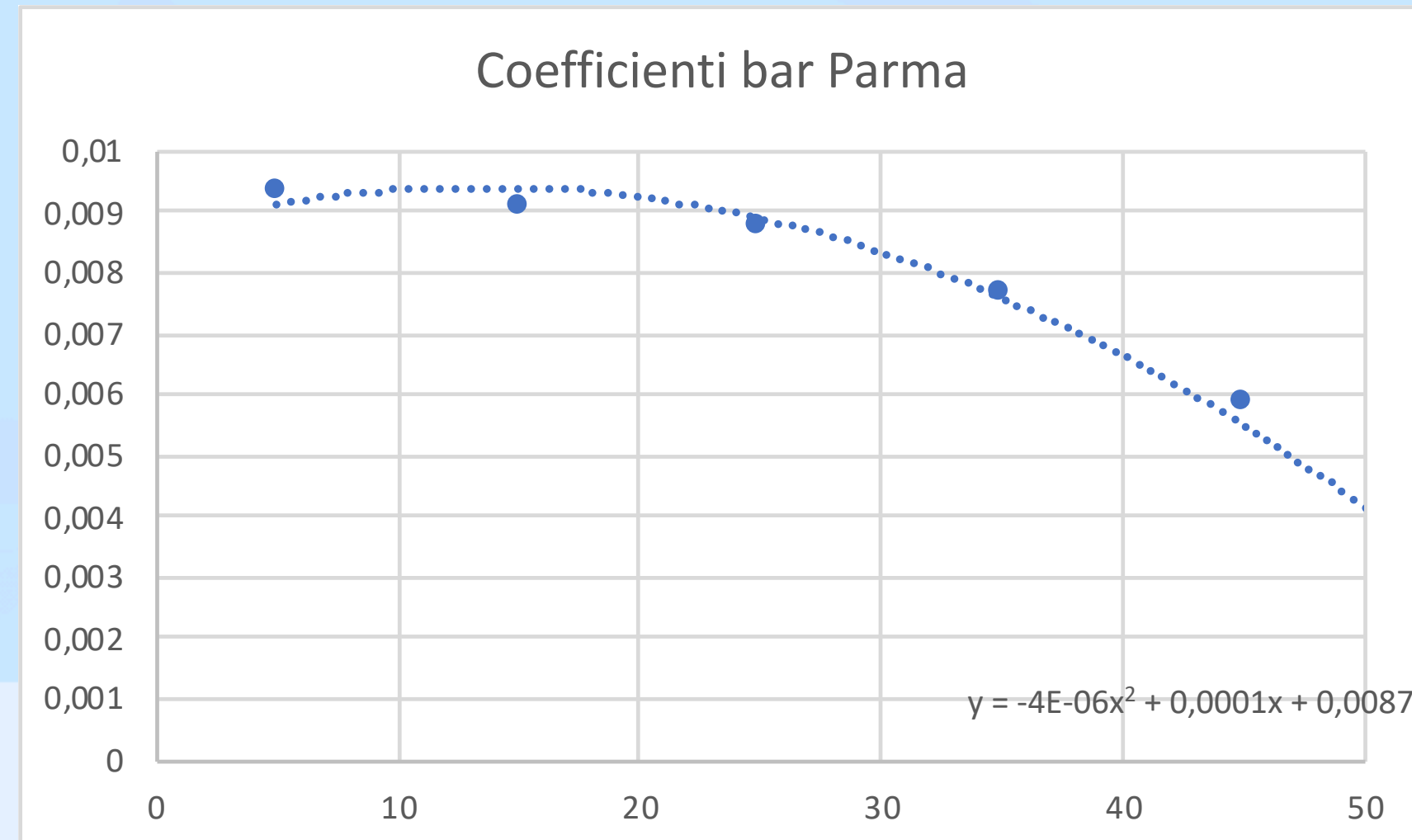
## ... e l'irregolarità del loro grafico pressure vs rate





# Esclusione dei risultati inaspettati

Di seguito i grafici dell'andamento del coefficiente barometrico senza l'anomalia dell'angolo theta fra 50° e 60°



# Conclusioni

## Spiegazione dell'anomalia e risultato dell'analisi

- Dalle misurazioni, si può dedurre che l'andamento del coefficiente barometrico, indipendentemente dalla località, risulta **decescente** all'aumentare dell'angolo theta (inclinazione della traccia ricostruita rispetto alla normale);
- Più nello specifico, per angoli compresi tra  $50^\circ$  e  $60^\circ$ , emergono risultati inaspettati probabilmente dovuti **alla geometria della traccia**, quindi alla troppa inclinazione di quest'ultima. Questo va ad inficiare sulla rivelazione.
- Il **rate** risulta naturalmente piccolo per la soppressione dei raggi secondari in virtù della **pressione atmosferica**. I conteggi dunque, risultano troppo **pochi**, quindi influenzano la statistica della misurazione.