Appendix\_1

ANOVA table for carbon with carbonate type (travertine or travitufa) as a factor

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Source* | *Sum of squares* | *Degree of freedom* | *Mean square* | *F-ratio* | *P-value* |
| Inter groups | 89,3811 | 1 | 89,3811 | 17,17 | 0,0003 |
| Intra groups | 130,116 | 25 | 5,20462 |  |  |
| Total (Corr.) | 219,497 | 26 |  |  |  |

Multiple Range Testing

Method: 95,0 % LSD

|  |  |  |  |
| --- | --- | --- | --- |
| *Carbonate type* | *Cases* | *Average* | *Homogeneous groups* |
| 2 (travertine) | 22 | 7,38409 | X |
| 1 (travitufa) | 5 | 12,068 | X |

|  |  |  |  |
| --- | --- | --- | --- |
| *Contrast* | *Sig.* | *Difference* | *+/- Limits* |
| 1 - 2 | \* | 4,68391 | 2,32783 |

\* indicates a significant difference.

Result:

There is a significant difference in the carbon content depending on the type of carbonate. Toba type carbonate samples (1) are more carbon enriched compared to travertine type samples (2).

ANOVA table for oxygen with carbonate type (travertine or travitufa) as a factor

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Source* | *Sum of squares* | *Degree of freedom* | *Mean square* | *F-ratio* | *P-value* |
| Inter groups | 48,8655 | 1 | 48,8655 | 110,48 | 0,0000 |
| Intra groups | 11,058 | 25 | 0,442318 |  |  |
| Total (Corr.) | 59,9235 | 26 |  |  |  |

Multiple Range Testing

Method: 95,0 % LSD

|  |  |  |  |
| --- | --- | --- | --- |
| *Carbonate type* | *Cases* | *Average* | *Homogeneous groups* |
| 2 (travertine) | 22 | -4,98727 | X |
| 1 (travitufa) | 5 | -1,524 | X |

|  |  |  |  |
| --- | --- | --- | --- |
| *Contrast* | *Sig.* | *Difference* | *+/- Limits* |
| 1 - 2 | \* | 3,46327 | 0,678616 |

\* indicates a significant difference.

Result:

There is a significant difference in oxygen depending on the type of carbonate. Toba type carbonate samples (1) are more enriched in oxygen compared to travertine type samples (2).

ANOVA table for oxygen with basement rock type as a factor

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Source* | *Sum of squares* | *Degree of freedom* | *Mean square* | *F-ratio* | *P-value* |
| Inter groups | 23,9629 | 3 | 7,98763 | 5,11 | 0,0074 |
| Intra groups | 35,9606 | 23 | 1,5635 |  |  |
| Total (Corr.) | 59,9235 | 26 |  |  |  |

Multiple Range Testing

Method: 95,0 % LSD

|  |  |  |  |
| --- | --- | --- | --- |
| *Basement rock* | *Cases* | *Average* | *Homogeneous groups* |
| *4 (Blue marls)* | *7* | *-5,31143* | X |
| *2 (Yellow marls)* | *5* | *-5,018* | X |
| *3 (Conglomerates)* | *10* | *-4,199* | X |
| *1 (Quaternary)* | *5* | *-2,616* | X |

|  |  |  |  |
| --- | --- | --- | --- |
| *Contrast* | *Sig.* | *Difference* | *+/- Limits* |
| *1 - 2* | *\** | *2,402* | *1,63595* |
| *1 - 3* | *\** | *1,583* | *1,41677* |
| *1 - 4* | *\** | *2,69543* | *1,51459* |
| *2 - 3* |  | *-0,819* | *1,41677* |
| *2 - 4* |  | *0,293429* | *1,51459* |
| *3 - 4* |  | *1,11243* | *1,27472* |

\* indicates a significant difference.

Result:

There is a significant difference in the oxygen as a function of the basement rock, especially with the deposits above Quaternary. The greatest difference exists between the samples on Quaternary (1) with respect to those on Blue Marl (4) and Yellow Marl (2). Quaternary samples are more enriched in oxygen.

ANOVA table for strontium with δ13C VPDB as a facto

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *Source* | *Sum of squares* | *Degree of freedom* | *Mean square* | *F-ratio* | *P-value* |
| Inter groups | 1,00327E6 | 1 | 1,00327E6 | 46,90 | 0,0000 |
| Intra groups | 534849 | 25 | 21394,0 |  |  |
| Total (Corr.) | 1,53812E6 | 26 |  |  |  |

Correlation Coefficient = 0,807633

R-squared = 65,2271 percent

R-squared (adjusted for d.f.) = 63,8362 percent

Standard Error of Est. = 146,267

Mean absolute error = 113,603

Durbin-Watson statistic = 0,998811 (P=0,0018)

Lag 1 residual autocorrelation = 0,374717

The output shows the results of fitting a model to describe the relationship between Sr and d13C VPDB. The equation of the fitted model is:

Sr = -160,037 + 67,6076\*d13C VPDB

Since the P-value in the ANOVA table is less than 0,05, **there is a statistically significant relationship between Sr and d13C VPDB at the 95,0% confidence level.**