Re: Simple question

Source: http://sci.tech−archive.net/Archive/sci.stat.math/2006−08/msg00255.html

- *From*: "Ray Koopman" <koopman@xxxxxx>
- *Date*: 26 Jul 2006 15:32:39 −0700

Enrique Cruiz wrote:

> Again, many thanks for the answer.
>
> On 2006−07−25 23:17:05 +0100, "Ray Koopman" <koopman@xxxxxx> said:
>
> > Look at plots of the row means and column means (of the new data).
> > They are far from flat.
>
> True, but it's sufficiently flat for me to ignore the variations. For
> instance, along the X dimension (181 data), the values slowly changes
> from 19.5 to 21.5 and back. A change like that over the 360 degrees
> (180 angles recorded) of azimuth if very small, and even more so when
> compared to the values the central peak (not shown in the data) can
> achieve, i.e. 20000. Furthermore, the rise in the middle is probably
> due to me not deleting the whole area of the central peak, hence
> causing a little rise in the middle.
>
> As for the variations along the Y dimension, there is indeed a change
> when elevation reaches 35 and more. But I am dubious whether the sharp
> drop really exists, or if it is the instrument that fails to record
> properly at these angles.
>
> Anyway, the changes along the X dimension are negligeable, and
> similarly for those along the Y dimension for 1<Y<35 (range of Y is
> [1,41]). Especially compared to the central peak, that is why I
> consider this surface as mostly flat. I agree that it is an
> approximation, but as a first attempt to model this process, it will
> serve my purpose well enough. That is why I am trying to prove that it
> can be statistically be modelled by a flat surface as a first
> approximation.
>
> Thanks again,
>
> Enrique

Statistically, it is clear that the surface is not flat, even if you

look at only 1 < Y < 35. The departures from flatness of both the X and Y averages are far too big, compared to the interaction, to be attributed to random error, whatever "error" may mean in your context. (Note that this test procedure, comparing main effects to the interaction, is biased against finding significant main effects.)

Here are the anova summary tables −− first for all the data, then considering only 1 < Y < 35.

Source df SS MS F p

X 180 2822.93 15.6829 10.4576 7.33*10^−244
Y 40 42200.8 1055.02 703.502 1.83*10^−2439
XY 7200 10797.6 1.49967
Total 7420 55821.4 7.52310

X 180 1180.14 6.55634 7.88288 1.68*10^−166
Y 32 1290.30 40.3219 48.4802 2.53*10^−269
XY 5760 4790.70 .831719
Total 5972 7261.14 1.21586

However, all that says nothing about whether the departure from flatness is negligible. That is a substantive question, not a statistical one, and the answer will be subjective. If the plot is sufficiently flat for you to ignore the variations then the departure from flatness is negligible for your purposes. Others may disagree, but the disagreement is about whether the departure from flatness is sufficiently large that it must be dealt with, not about whether it exists.

.