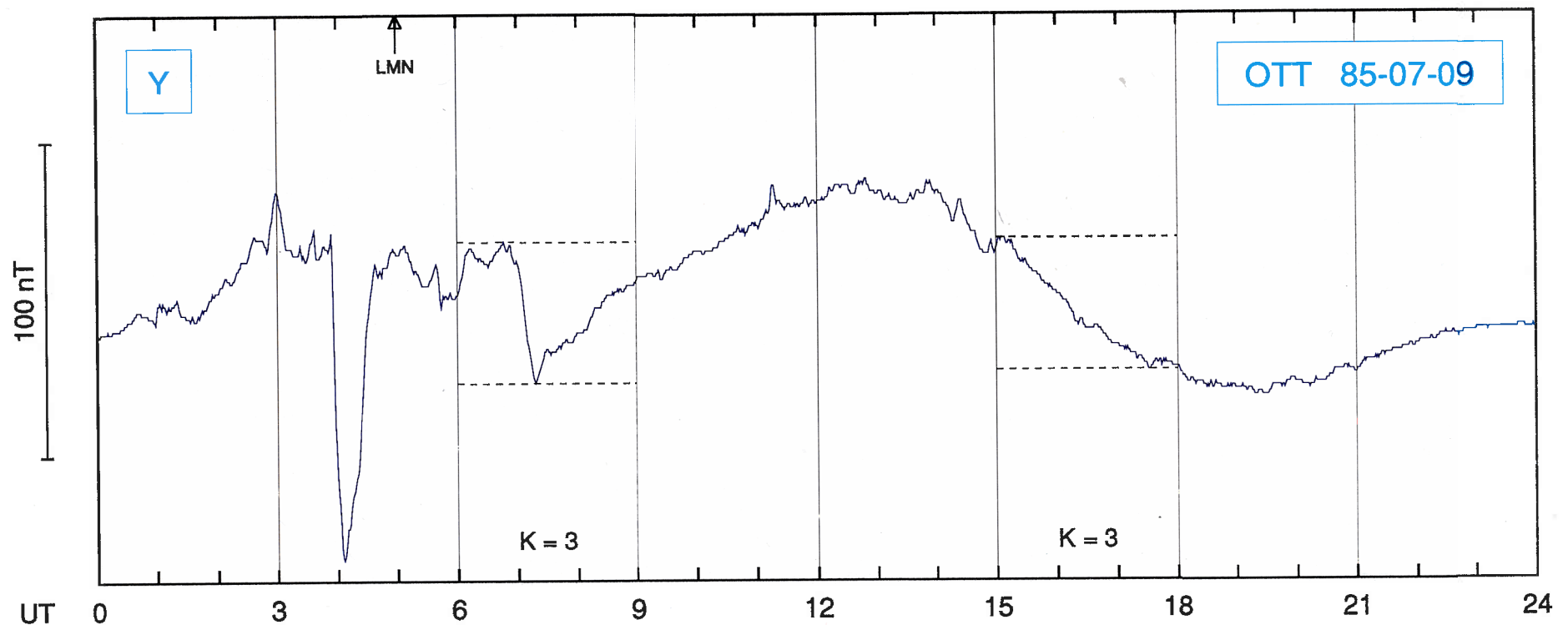


CRITERIA USED IN THE DEVELOPMENT OF THE METHOD

- The method should give same results as hand-scaling
- The method should be the same for all observatories
- The method should be the same at all times
- The method should be easy to computerize

STEP 1 : Compute preliminary K-indices by max-min-method

- For each 3-hour interval and for X and Y compute the difference between maximum and minimum values.
- Look up the corresponding K-index from the K-value table of the particular observatory.
- Use the larger one of the computed indices for X and Y as a preliminary K-index

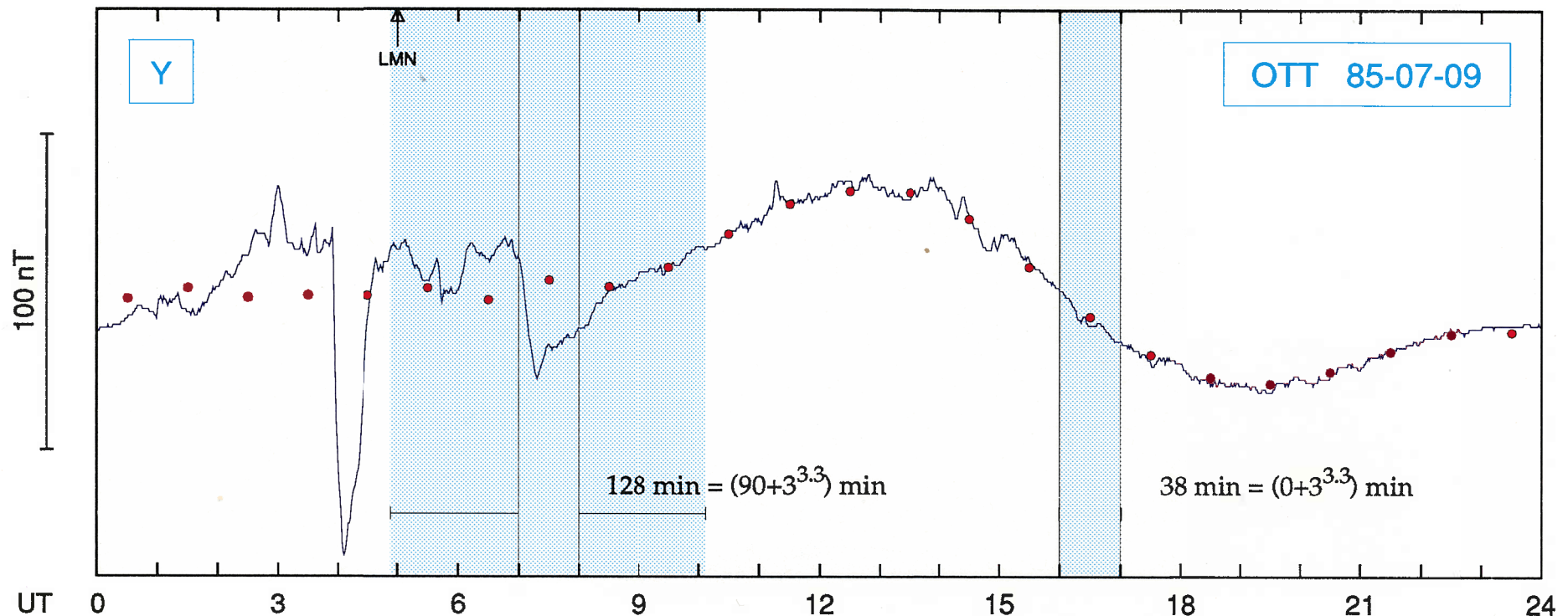


STEP 2 : Compute averages of the field values for each hour

- In computing the average include data from intervals before and after the hour with lengths

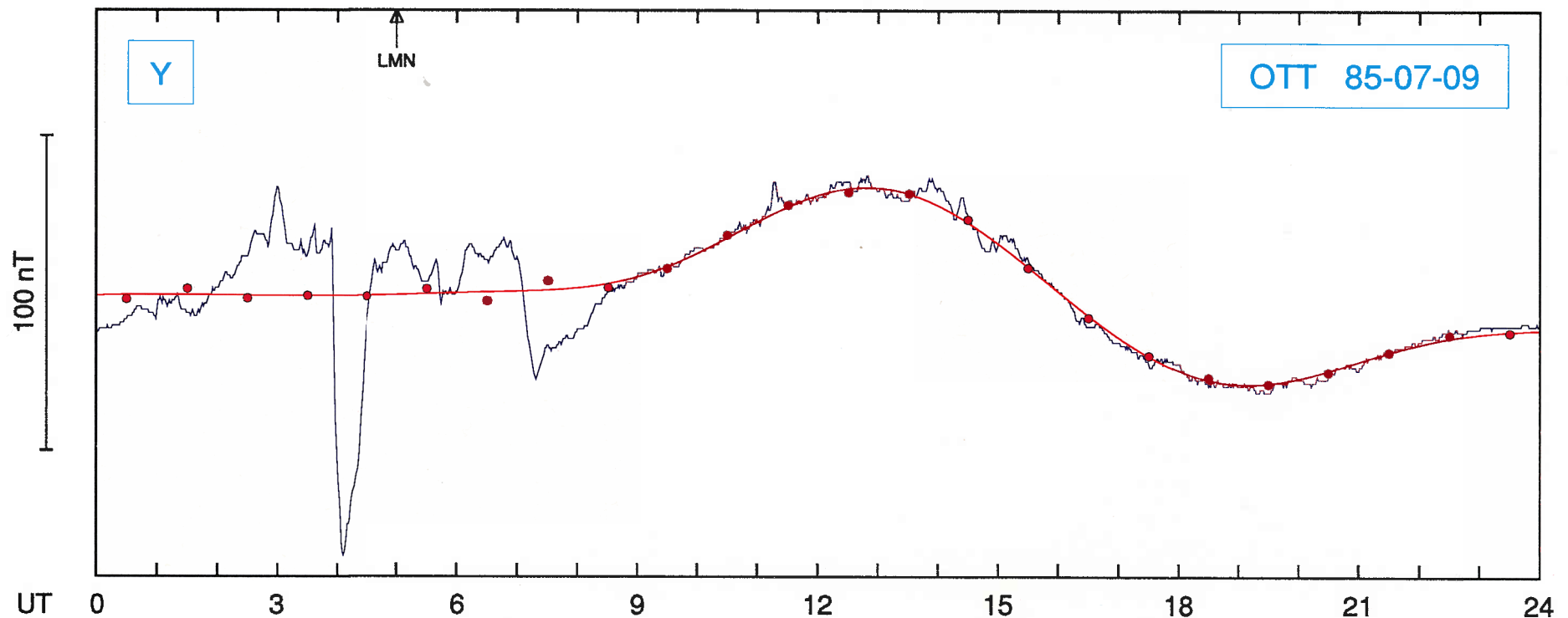
$$L = (L_{hour} + K^{3.3}) \text{ minutes}, \quad L_{hour} = \begin{cases} 90, & \text{Local hours 21-03} \\ 60, & \text{Local hours 18-21 and 03-06} \\ 0, & \text{Local hours 06-18} \end{cases}$$

and K is the preliminary K-index calculated in step 1.



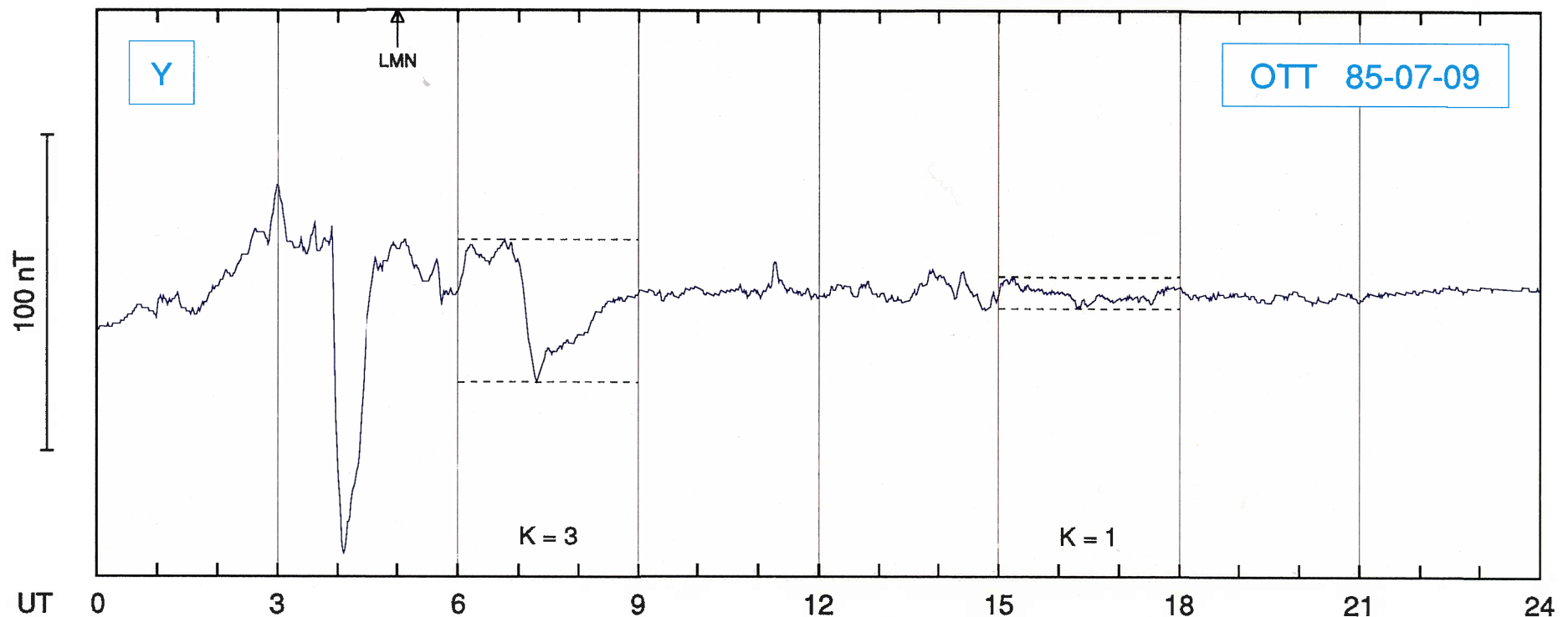
STEP 3 : Compute a preliminary S_R -curve by harmonic fitting

- Fit a 5th degree harmonic curve to the 24 average points computed in step 2.



STEP 4 : Compute new K-indices from the difference curves Original Data - Preliminary S_R

- Use the max-min method to determine K-indices for both X and Y from the difference curves.
- Use the larger one of the computed indices for X and Y as a new K-index.

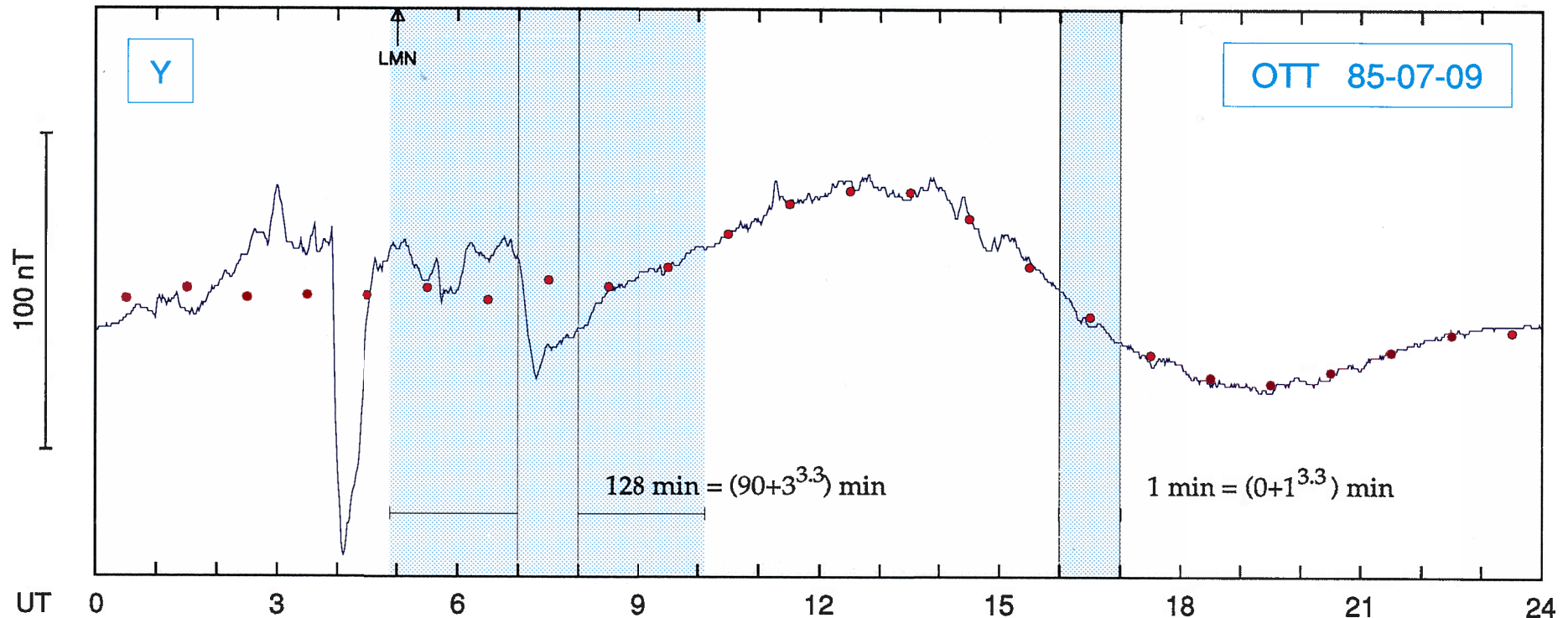


STEP 5 : Compute averages of the field values for each hour

- In computing the average include data from intervals before and after the hour with lengths

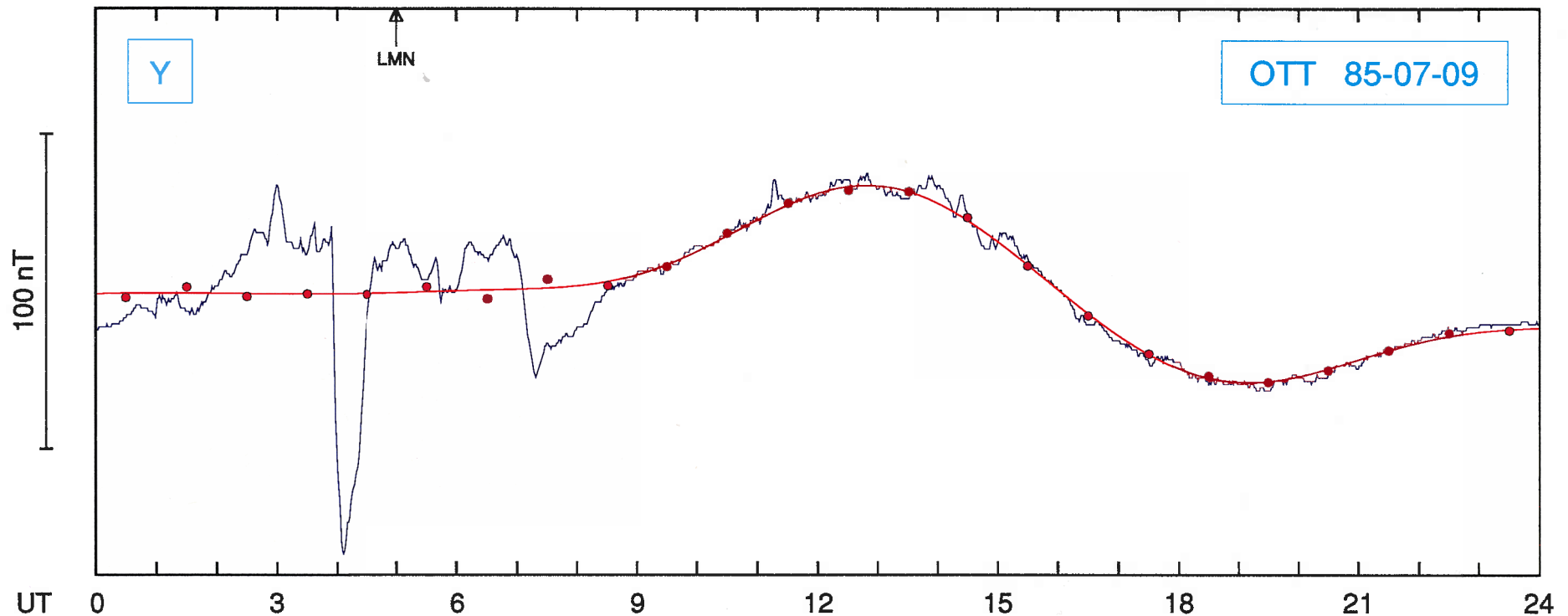
$$L = (L_{hour} + K^{3.3}) \text{ minutes}, \quad L_{hour} = \begin{cases} 90, & \text{Local hours 21-03} \\ 60, & \text{Local hours 18-21 and 03-06} \\ 0, & \text{Local hours 06-18} \end{cases}$$

and K is the new K-index calculated in step 4.



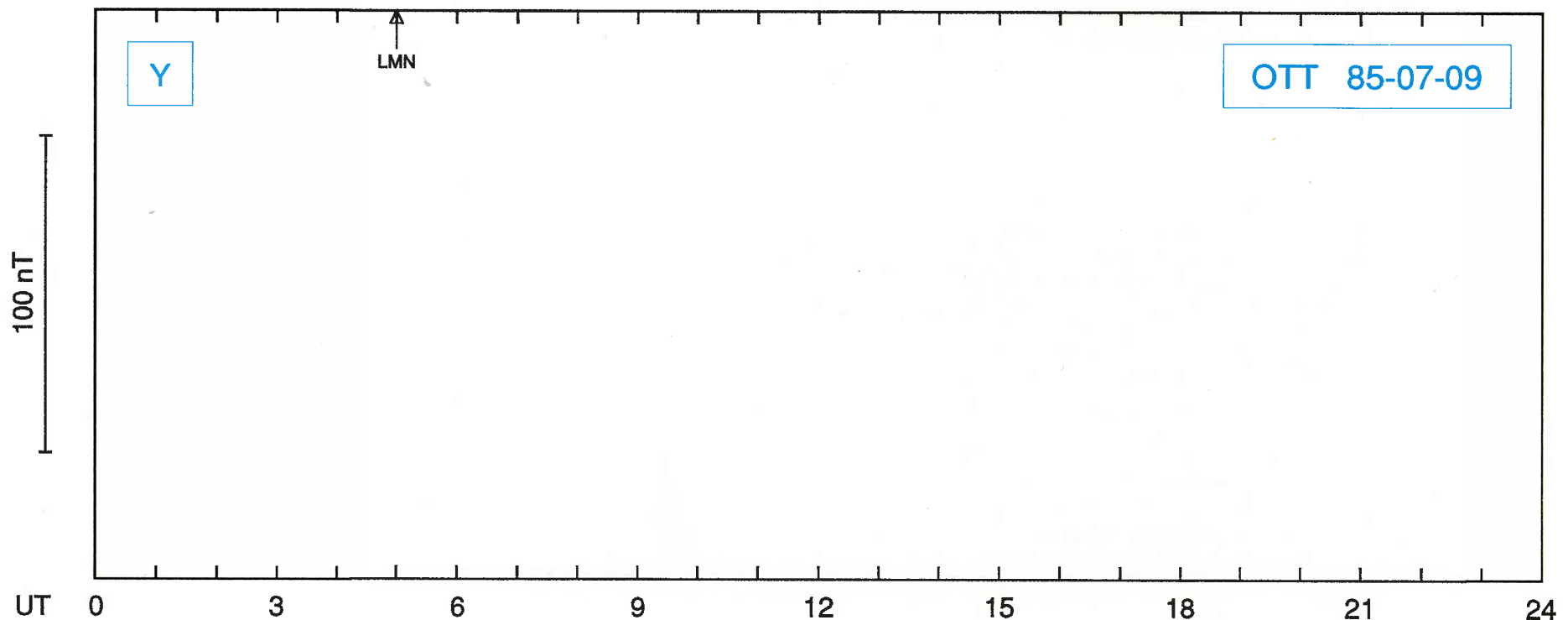
STEP 6 : Compute the final S_R -curve by harmonic fitting

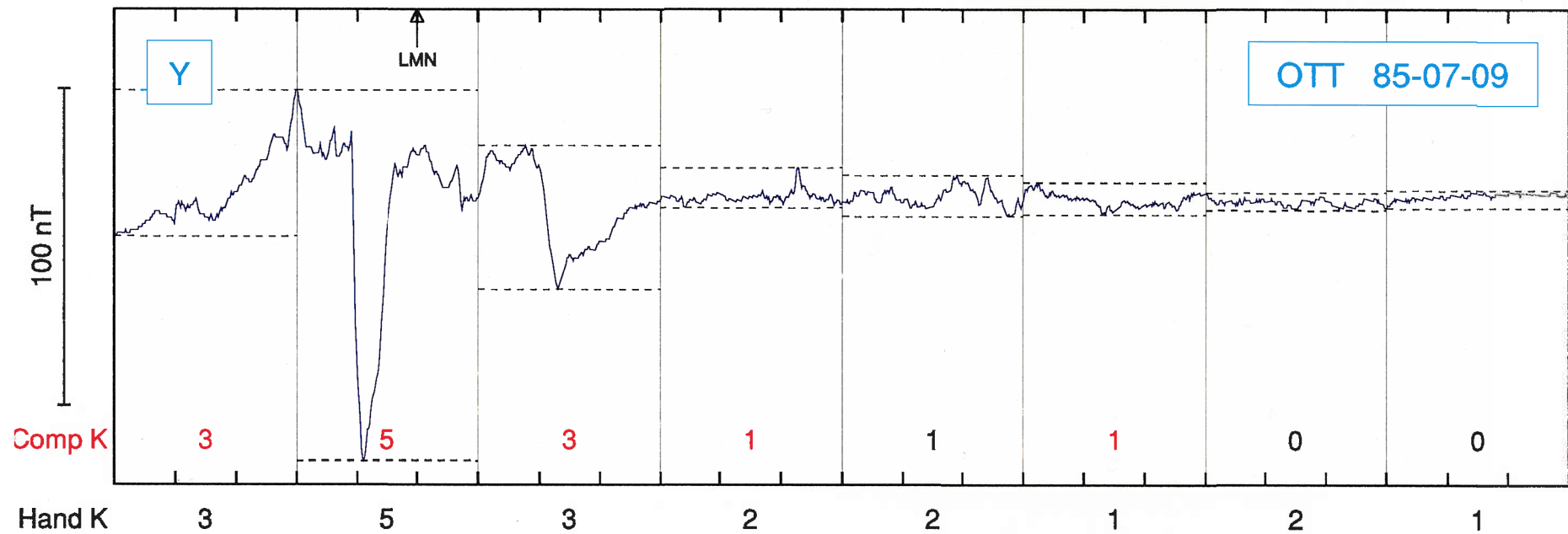
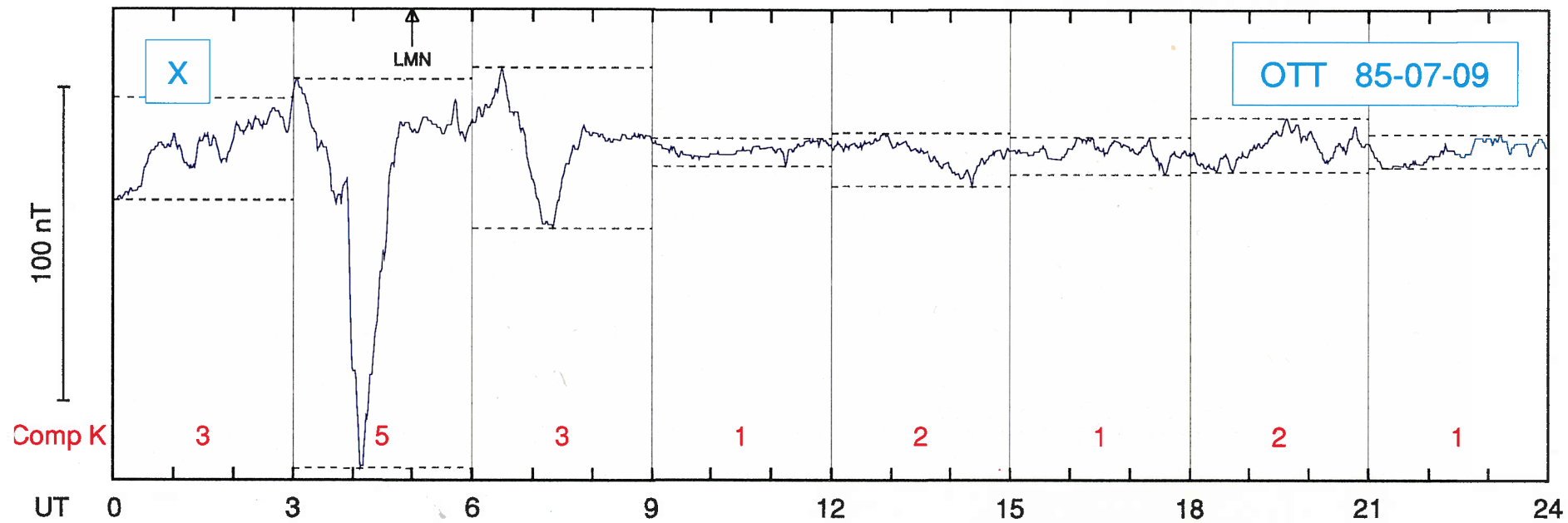
- Fit a 5th degree harmonic curve to the 24 average points computed in step 5.



STEP 7 : Compute final K-indices from the difference curves Original Data - Final S_R

- Use the max-min method to determine K-indices for both X and Y from the difference curves.
- Use the larger one of the computed indices for X and Y as the final K-index.





Remarks about the FMI-method

- Method and parameters same for all observatories.
- Parameters same for all times.
- Easily transported to a PC.
- Fast (computing time 2-3 seconds/day on a 386-micro).
- Accepts different data sampling rates.
- Requires ($L_{hour} + K^{3.3}$) minutes of data (max. one day) from previous and next day.