

## Correlation and Regression

From the large data set, the daily mean windspeed,  $w$  knots, and the daily maximum gust,  $g$  knots, were recorded for the first 10 days in September in Hurn in 1987.

Day of month	1	2	3	4	5	6	7	8	9	10
$w$	4	4	8	7	12	12	3	4	7	10
$g$	13	12	19	23	33	37	10	n/a	n/a	23

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### Correlation

1. What is bivariate data?
2. What is the independent or explanatory variable?
3. What is the dependent or response variable?
4. State the meaning of n/a in the table
5. Draw a scatter graph to represent the data
6. What is correlation?
7. Describe the correlation between windspeed and gust
8. Interpret your answer
9. Do windspeed and gust have a causal relationship?
10. What is the product moment correlation coefficient (pmcc or  $r$ )?
11. Calculate the product moment correlation coefficient (pmcc or  $r$ )
12. With reference to  $r$  comment on the suitability of a linear regression model for these data

## Regression

1. What is the least squares regression line of  $y$  on  $x$ ?
2. Calculate the least squares regression line of  $y$  on  $x$
3. Draw the least squares regression line of  $y$  on  $x$  on your scatter graph
4. Interpret  $a$
5. Interpret  $b$
6. Use your regression line to estimate the gust for a windspeed of 6 knots.  
Comment on the reliability of this estimate.
7. Use your regression line to estimate the gust for a windspeed of 23 knots.  
Comment on the reliability of this estimate.
8. Use your regression line to estimate the windspeed for a gust of 20 knots.  
Comment on the reliability of this estimate.
9. Calculate the regression line of  $x$  on  $y$