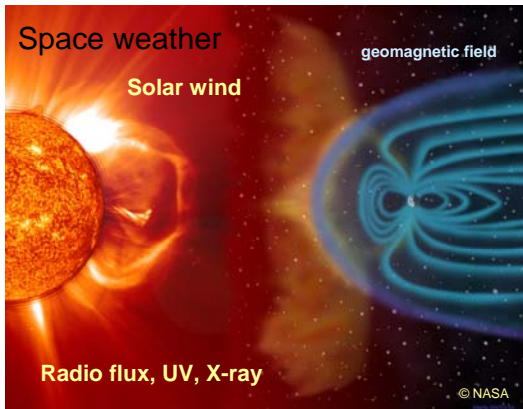




# A CHROMOSOMAL ABERRATIONS IN THE BANK VOLE: RISK ASSESSMENT

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A rate of chromosomal aberrations (CA) in bone marrow cells of the bank vole (*Clethrionomys glareolus*) from a cyclic population at Middle Urals southern taiga (57°15'N, 58°44'E) was assessed in 1999-2011. Total 22,553 metaphases (in 557 individuals) were examined and 383 cells with CA events were detected, thus CA expected marginal rate is about 17 (99% CI: 15-19) per mille. Competing models of *logit regression* ( $\phi = Dev/rdf = 0.172$ , *underdispersion*) were ranked using (*minQBIC*) model selection technique. Relative importance ( $w^* = \sum w_i$ ) and *quasi-likelihood ratio* statistics ( $QLR = [2LL(\theta_i) - 2LL(\theta_0)] / \phi$ ) for subset of risk factors were assessed. Adjusted effects – Odds Ratio (*since low frequency, OR may be interpreted directly as Risk Ratio, OR ≈ RR*) of categorical (gender, age<sup>1</sup>, reproductive status<sup>1</sup>, phase of population cycle, year<sup>2</sup>) and standardized continuous predictors (density<sup>2</sup>, sunspot number<sup>3</sup>, radio flux<sup>3</sup>, geomagnetic field anomalies<sup>3</sup>) on CA rate were estimated. (<sup>1 2 3</sup> – multicollinearity within set)

- The “gender” has weak effect ( $w^* = 0.19$ ,  $QLR(1) = 7.09$ ), and males to females OR is 1.12 (95%CI: 1.03–1.22).
- Mature individuals ( $w^* = 1.0$ ,  $QLR(1) = 49.51$ ) exceed immature in 1.37 (1.11–1.69) times.
- In the “increase” ( $w^* = 1.0$ ,  $QLR(1) = 107.40$ ) the odds of CA are higher than in other phases by 1.86 (1.34–2.14).
- The risks are doubled 2.02 (1.79–2.33) from minimum to maximum of solar activity ( $w^* = 1.0$ ,  $QLR(1) = 112.73$ ).
- After accounting for any of two correlated ( $r = 0.99$ ) predictors (sunspot number or solar radio flux), the inclusion of geomagnetic activity in the models is redundant ( $QLR(1) = 0.19$ ,  $p = 0.66$ ).

