



**Figure S4.** Codon and amino acid usage with GC3-content. (a) The usage frequency variation of amino acids in three groups along with the regional GC3-content; (b) the slope value in a linear regression analysis for the lines in (a); (c) The patterns of the correlation slope (left) and the coefficient of determination  $R^2$  values (right) for codon usages between different GC3-groups.