**Bioclimatic indices focusing on heat unit accumulation**

* The Winkler index (WI) (Winkler et al. 1974, Jones et al. 2010), more commonly recognized as growing degree days (GDD), refers to the degree day units accumulated during the growing season with a base temperature of 10°C. This required heat load (GDD) is a function of grapevine variety; therefore, the re -ported minimum value and optimal range of the GDD can vary. In our study, GDD was computed based on a fixed growing season from April to October in order to facilitate comparisons with other grape-producing re-gions.
* The Huglin index (HI) (Huglin 1978) combines the air temperature during the active period of vege- tative growth with a coefficient of day length that varies according to the latitude (see Table S1 in the Supplement at www. int-res. com/ articles/ suppl/ c076 p203 \_ supp. pdf). It provides valuable information on the local heat summations by considering the average and maximum temperatures and weighting the accu- mulated temp eratures to the daytime period. Huglin & Schneider (1998) classified grape varieties based on HI.
* Growing season temperature (GST) (Jones 2005) is the average temperature of the growing season from April to October.
* Biologically effective degree days (BEDD or E°) (Gladstones 1992) account for heat accumulations that are defined by upper and lower temperature thresholds (between 10 and 19°C), and the BEDD formulation also modifies the heat accumu-lation for diurnal ranges (Table S1). Gladstones (1992) applied BEDD to define corresponding maturity groupings of various grape cultivars (Table 1 The HI and BEDD use a coefficient (k) to represent the changes in day length imposed by latitude (Table S1). The increase in day length during the growing season increases potentially relative to an in crease in latitude. A clear definition of k does not exist; however, Huglin (1978) categorized k based on the latitudes between 40° and 50° into 5 classes, where k had a range of 1.02 to 1.06. The k for lati- tudes equal to or lower than 40° was reported to be 1 (Huglin 1978, Tonietto & Carbonneau 2004).
* The latitude temperature index (LTI) (Jackson & Cherry 1988) is the result of multiplying the mean temperature of the warmest month by the subtraction of latitude (ϕ) of the location from 60 (60 – ϕ)

**Bioclimatic indices focusing on length of growing season**

* Growing season suitability (GSS) (Malheiro et al. 2010, Santos et al. 2012) is the fraction of days from April to September with a daily mean air temperature above 10°C. The time frames are based on the standard formulation of the indices to be able to facilitate the comparison among various regions.
* The length of growing season (LGS) (Jackson 2008) is the number of days with mean temperatures above 10°C for a growing season ranging from April 1 to October 31.
* The frost free days index (FFD) (Magarey et al. 1998) is used to determine growing season length; it is the period between the last frost (temperatures below 0°C) in spring and the first frost in fall.

**Bioclimatic indices focusing on minimum temperature**

* The cool night index (CI) (Tonietto & Carbonneau 2004) takes into account the minimum temperature during grape maturation, which is normally the aver-age minimum air temperature in September.
* Mean thermal amplitude (MTA) (Mullins et al. 1992, Ramos et al. 2008) is the difference between the minimum and maximum temperature in September and is as - sociated with grape quality and composition (Montes et al. 2012). Adjustments to MTA should be made based upon phenology and not calendar. Temperatures below −17°C are commonly considered the lethal lower temperature limit for grapes; defined as the minimum temperature index (Min.Temp.) (Hidalgo 2002), a vital constraint of growing grape vines. However, cold acclimation is a physiological process that happens over a period of time, so using a single

**Bioclimatic indices focusing on precipitation**

* The growing season precipitation index (GSP) (Blanco-Ward et al. 2007) provides the general suitability used in climate zoning for viticulture that accumulates precipitation during the growing season (Table S1). However, the GSP is only relevant for regions where grapes are normally not irrigated.
* The hydrothermic index (HyI) (Branas 1974) combines the effect of air humidity and temperature using precipitation as a surrogate during the growing season to assess the risk of grapevine exposure to certain diseases, such as downy mildew, as well as water stress.

