Solar radiation is a key element of the Earth's climate system and one of the most important variables in the energy balance of the active surface. The inflow of radiant energy to the Earth's surface depends on the movement (circulation) of the atmosphere and on the associated changes in the amount of aerosols contained in the atmosphere as well as on cloudiness changes (which reduce the inflow of radiation to the Earth's surface through reflection, dispersion and absorption processes). The main aim of this paper was to determine the influence of atmospheric circulation on the amount of global solar radiation reaching the Earth's surface in Poland. The research was based on source material from 1986-2015, originating both from ground-based and satellite measurements as well as from meteorological reanalyses. Global solar radiation was analysed based on data from CM SAF satellite products which were verified using ground-based measurement data from 17 actinometric stations located in different Polish regions. The paper describes the variability of solar radiation, including trends and fluctuations of the amount of global solar radiation over Poland in the analysed multi-year period. The mean annual sum of solar radiation increased on average by 7.16 $MJ \cdot m^{-2} \cdot year^{-1}$, but this tendency varied in individual regions of Poland. The observed fluctuations of mean annual values of global solar radiation around their upward trend allowed to assign a statistically significant sinusoidal trend with fluctuation period of approximately 14 years to the empirical data. Thanks to wavelet analysis, several-year fluctuation cycle of annual sums of solar radiation (12-13 years long) was discovered. Atmospheric circulation was described using three methods based on data from meteorological reanalyses. The following methods were used: air pressure field distribution over Europe and the North Atlantic, 72-hour backward trajectories determining the direction of air masses advection over Poland and atmospheric circulation types designated with the use of modified Lityński's classification. It was determined how the amount of global solar radiation reaching the Earth's surface depended on the pressure field at sea level in the Euro-Atlantic sector. Areas in which the change of air pressure has a significant influence on the changes of radiation over Poland were identified. Mean daily sums of global solar radiation were determined in relation to groups of trajectories characterised by a certain similarity of shape. Mean daily sums of radiation during individual circulation types, during A, 0, C macrotypes and on days with advection from particular directions were presented. Also the spatial distribution of radiation over the area of Poland during individual circulation types was shown. In the analyses special attention was paid to days with extremely large sums of solar radiation (above percentile 0.95). The largest daily sums of solar radiation are connected with anticyclonic circulation types, and the smallest ones – with cyclonic types. The largest mean daily sum of solar radiation occurs during south-

western anticyclonic circulation, which is related to the significantly expanded Azores High. The spatial distribution of solar radiation daily sums over the territory of Poland also depends on the circulation type. For most of the year, the circulation types with the northern and eastern components (N-NE-E) are associated with the reduction of the amount of solar radiation from north to south, while the inflow of air masses from the S-SW-W directions favours the reduction of radiation from south to north. The paper also demonstrates that the circulation type (i.e. prevailing pressure system) has a greater influence on daily sums of global solar radiation over Poland than the direction of air masses advection. The research results presented in the paper show that atmospheric circulation plays a significant role in determining the amount of solar radiation reaching the Earth's surface in Poland.