|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| millennial cycle phase | spring | summer | autumn | winter |
| 1st postulate  **solar activity** varies cyclically | increasing | high | decreasing | low |
| 2nd postulate  solar activity affects **Earth’s temperature** | increasing | warm | decreasing | cool |
| 3rd postulate  temperature affects **food resources** | increasing | abundant | decreasing | scarce |
| 4th postulate  food affects **human populations** | low | increasing | high | decreasing |

**Figure 12:** Summary of the phases and postulates of the proposed 900-year climate cycle.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | (A)  Human  population | (B)  Characteristic states | (C)  Power center shift | (D)  Active  Class | (E)  Emerging  class |
| millennial  spring | Internal conflict leading to cultural advancement | Emergence of major maritime states or cultures | Population and power shifted to higher latitudes and altitudes | Initiation and expansion of trade routes  (traders) | Some major advances in engineering  (engineers) |
| millennial  summer | High agricultural yields and population growth | Large states with centralized governments and increased social stratification | Flourishing of arts, culture and science | Large monumental construction projects  (builders) | Invasions by mobile continental populations  (invaders) |
| millennial  autumn | Internal conflict within states due to scarcity and breakdown of trade routes | Population and power centers shifted inland and away from coasts | Large migrations and invasions from nomadic to urban regions | Development and spread of military technology  (warriors) | New philosophies develop  (philosophers) |
| millennial  winter | Low agricultural yields, population decline, collapse of civilizations or abrupt cultural transitions | Dense collection of small independent states | Population and power shifted to lower latitudes and altitudes, sources of freshwater and peninsulas | Rapid expansion of a new religion  (priests) | Exploration and seeking of new lands and trade routes  (explorers) |

**Figure 15:** Characteristic indicators of the phases of the 900-year climate cycle.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| country | population (106) in 2017/ 2050 | renewable freshwater (km3/yr) | freshwater consumed (km3/yr) | desalination (km3/yr) | water deficit (km3/yr) in 2017/2050 |
| Libya | 6.6 / 9.0 | 0.7 | 5.7 | 0.1 | -5.0 / -7.0 |
| Egypt | 96.4 / 137.9 | 57.5 | 64.2 | 0.2 | -6.5 / -34.1 |
| Syria | 17.1 / 31.2 | 16.8 | 14.0 | 0.0 | +2.8 / -8.7 |
| Yemen | 27.8 / 46.1 | 2.1 | 3.6 | 0.0 | -1.4 / -3.8 |
| Saudi Arabia | 33.1 / 40.3 | 2.4 | 21.2 | 2.2 | -16.6 / -21.2 |
| Uzbekistan | 32.0 / 35.1 | 48.9 | 58.4 | 0.0 | -10.0 / -15.8 |
| Turkmenistan | 5.8 / 6.6 | 24.8 | 27.9 | 0.0 | -3.1 / -7.2 |
| Pakistan | 207.9 / 290.8 | 246.8 | 200 | 0.0 | +46.8 / -33.0 |

**Figure 33:** Countries with predicted water shortages. {305}{1177}{1385}{1521}{2065}{2136}