

Chapter 1 : Past sea level - Wikipedia

sea level history suggests we should expect much higher rates of sea level rise in the future." That last sentence should read near future. ie next 10 - 50 yrs. ie the rate is around m per century, but we have be heating up relatively rapidly for the last 50yrs or so.

Home Ocean Facts Is sea level rising? Is sea level rising? Yes, sea level is rising at an increasing rate. With continued ocean and atmospheric warming, sea levels will likely rise for many centuries at rates higher than that of the current century. In the United States, almost 40 percent of the population lives in relatively high-population-density coastal areas, where sea level plays a role in flooding, shoreline erosion, and hazards from storms. Atlas of the Oceans. Global sea level trends and relative sea level trends are different measurements. Just as the surface of the Earth is not flat, the surface of the ocean is also not flat—in other words, the sea surface is not changing at the same rate globally. Sea level rise at specific locations may be more or less than the global average due to many local factors: Sea level is primarily measured using tide stations and satellite laser altimeters. Tide stations around the globe tell us what is happening at a local level—the height of the water as measured along the coast relative to a specific point on land. Satellite measurements provide us with the average height of the entire ocean. Taken together, these tools tell us how our ocean sea levels are changing over time. Global sea level has been rising over the past century, and the rate has increased in recent decades. In 1992, global sea level was 2. Sea level continues to rise at a rate of about one-eighth of an inch per year. Higher sea levels mean that deadly and destructive storm surges push farther inland than they once did, which also means more frequent nuisance flooding. Disruptive and expensive, nuisance flooding is estimated to be from percent to percent more frequent within U. The two major causes of global sea level rise are thermal expansion caused by warming of the ocean since water expands as it warms and increased melting of land-based ice, such as glaciers and ice sheets. The oceans are absorbing more than 90 percent of the increased atmospheric heat associated with emissions from human activity. Sea level rise at specific locations may be more or less than the global average due to local factors such as land subsidence from natural processes and withdrawal of groundwater and fossil fuels, changes in regional ocean currents, and whether the land is still rebounding from the compressive weight of Ice Age glaciers. In urban settings, rising seas threaten infrastructure necessary for local jobs and regional industries. Roads, bridges, subways, water supplies, oil and gas wells, power plants, sewage treatment plants, landfills—virtually all human infrastructure—is at risk from sea level rise.

Chapter 2 : Sea Level Rise | Smithsonian Ocean

ZIMSEC O Level History Notes: The Zulu under Tshaka: The rise of Tshaka Shaka was born in as an illegitimate of Senzangakona who was a Zulu chief and Nandi a daughter of chief of the Elangeni tribe.

It can also be defined as a form of government in which all people can choose their leaders and hold them accountable for their policies and conduct in office. Democracy entails the key elements of basic human rights, free and fair elections and equality of all people before the law. Generally the term democracy can simply mean the rule of people who are divided by their own concern. Historically Democracy was said to be practiced for the first time in ancient Greek especially during the BC years ago which basically was under direct democratic system. Due to the shortage of number of Authorians in Greek in which who ever in the state had a choice of providing a suggestion so as to promote the social, economic and political matters of the state. Later due to the increase of populations there was a need of indirect democracy Representatives. Democracy spread to other parts of the world especially in England and France. It was achieved through revolutions 17th C England and 18th C- France. Later democracy spread to USA, the rise of democracy in America act as the main bridge to the rise and spread of democracy in the world. The principle that governed politics in Europe before the rise of democracy a. Absolutism This was one of the main principles that governed politics in Europe. Throughout Europe in the period before the French revolution of , the government was in the hands of few individuals. The individuals had absolute power and in most cases their positions were hereditary. In France, the king was above the law and not controlled by it. Divine right of the king. This was the belief that the power of monarchies was given directly by God and thus monarchs were answerable only to God. Any opposition to the king was an attack on God himself. This was very true in Britain during the reign of king James I. Feudalism as practiced in the kingdom of England was a state of human society which was formally structured and stratified on the basis of land tenure. The land lords were part and parcel of the government. In France, the ancient regime was characterized by distinctive classes of the clergy and the nobles. The church and the state were inseparable There was a strong relationship between the church and the state in Europe before the rise of democracy. The official faith or religion in France was supposed to be Catholics. The pop could even influence the decisions of the kings of France. In Britain, the official faith or religion was Anglican. All members of the royal family had to be Anglicans. The English revolution The glorious revolution - The English revolution refers to series of events in Britain that led to the collapse of feudalism and destroyed absolutism and serfdom in Great Britain. There were series of conflicts in Britain; the commercial bourgeoisie were determined to destroy feudalism. The bourgeoisie wanted to make the crown an overall leader of England without the assistance of the landlords. Another conflict was the control of the common land because the monarchy was against the enclosure system. Due to these conflicts, the democracy was abolished in but the king was restored as the head of the state. There was also the passage of the bill of rights which included the following; a. Any English monarchy must be a member of the Anglican Church. The king has no powers to increase taxes without the general consent of the parliament. The elections of the members of parliament should be free. It declared that there should be frequent parliamentary elections. Causes of the English revolution 1. Heavy taxation The merchants were gaining a lot of influence, hence the king decided to impose heavy taxes on the merchants so as to control their growing influence. Taxes hindered business activities which forced the merchants to rise up and overthrow the government. Principle of divine right of the king. The king argued that he was an absolute and his power could not be questioned by man. The British people wanted this principle to be changed because they wanted a king who will be answerable to them. Role of English philosophers. The English philosophers also contributed to the pot break of the English. Their writings enlightened the English people about weakness of old system. John Locke an English philosopher attacked the monarchy as being autocratic and oppressive in nature. John Locke wanted a king who will be accountable to the people. These writings partly prompted the English people to stage a revolution. Role of Oliver Cromwell. Oliver Cromwell contributed to the outbreak of English revolution by uniting the people to remove the dictatorial monarchy. He was protesting against religious discrimination and

all forms of dictatorships in England. Oliver Cromwell even suggested that King Charles has to be assassinated to pave a way for the establishment of a new government. The enclosure system was an agreement reached in parliament by wealthy landowners to buy small peasants landless consequently the peasants appealed to the king to stop the process of enclosure. The king tried to stop the enclosure system but his actions worsened relations between him and the wealthy. The emergency of classical economists. The emergence of classical economists played huge role in the outbreak of the English revolution. Economists such as Adam Smith, David Ricardo and Thomas Malthus advocated private property and individual freedom in economic life of a society. Their views brought awareness among the people thus leading to the English evolution. There were religious conflicts in where king Henry VIII declared himself the king of Church of England, this action drew resistance from some of the church which led to the rise of a group known as puritans. The puritans were dissatisfied with the church and decided to separate themselves from the main stream, the king responded by persecuting them and calling them enemies. This led to the outbreak of the English revolution. Emergency of commercial bourgeoisie class. The emergency of a bourgeoisie class contributed to the outbreak of the English revolution. This class was determined to conduct business activities in England thus any class of people that tried to hinder their goals was overthrown. The monarchy had failed to introduce liberal economic policies that would support capitalism thus the commercial bourgeoisie joined with the peasants to stage the revolution. Maintenance of discriminative classes. The maintenance of discriminative classes contributed to the outbreak of the English revolution. The nobility and the clergy were the most privileged class. The middle class consisted of professionals and government officials and the last class consisted of the peasants who were very poor. It was the peasants who united with the commercial bourgeoisie to stage a revolution. The effects of the revolution paved way for the rise of capitalism. Introduction of free trade. The new government pursued the laissez faire policy whereby it did not intervene in economic activities. The government allowed the domestic economy to operate fairly with few controls. The absence of government interference encouraged the investors to increase production thus leading to the industrial revolution. Seizure of political power by the merchants. There was seizure of political power by the merchants; this was a fundamental change in Britain because before the revolution all political powers rested in the hands of the king. The merchants played a great role in abolishing feudalism and introduced capitalism. The unification of England played a great role in the rise of capitalism. The coming together of Britain, Wales, Scotland and Ireland widened the market thus playing a crucial to support the industrial revolution consequently leading to the rise of capitalism. The revolution contributed to the abolition of serfdom and absolutism, there was introduction of a constitution rights. The abolition of serfdom created free workers who were needed by capitalist industries thus leading to the rise of capitalism. Control of the church. There was confiscation of church land and the church was separated from the state, this created room for the introduction of liberal capitalist ideas which supported the rise of capitalism. The revolution abolished feudal land tenure system and put land in the hands of the capitalists who carried out mechanized agriculture which paved way for the rise of the agrarian revolution. The agrarian revolution played a great role in the rise of capitalism. It brought multiparty political system, basically in Great Britain where Conservative party and Liberal party were enacted. This give chance to individuals to select the leader of their wishes, hence rise of democracy. Emergence of shared government. The English revolution of 17th C made the emergence of a shared government between common people and the existing government. It brought much freedom of worship as they were able to worship the way they wish in any sect. Respect of human rights. The English revolution gave room to the respect of human right as opposed from the former feudal monarchies which demanded the right of human being. The revolution brought realistic constitution. It led to the country governed by the rule of law, all matters of the state follow the principle and law of the country. Freedom of debate and expression. The England political revolutions played a great role for the rise of democracy in the world. The parliament was given high states of debating bill, to amend laws etc. The revolutions spread ideas of democracy to other countries such as France.

Chapter 3 : Rise | Define Rise at www.nxgvision.com

The analysis goes further than explaining historical sea level rise. It includes worrying projections for the future. By extending their findings to future scenarios, the scientists showed that.

The island is roughly five square kilometers in area, and is quickly disappearing due to erosion and rise in sea level. Three top climate scientists just made a very bold prediction regarding sea level rise; we should know in a few years if they are correct. We can actually measure the amount of extra heat. Since most of it ends up in the oceans, we can also measure other changes in the oceans. For instance, the oceans are rising. Measurements taken from physical gauges and from satellites confirm sea level rise. The cause of the rise is more complex. Part of the rise is from ocean warming – warm water is less dense so the sea level rises as temperatures increase. Another part of the rise is from melting ice, especially ice that is currently on land like glaciers and ice sheets. As this ice melts and flows into the oceans, the water levels rise. A third reason for sea level changes is from alterations of where water is stored on the planet. For instance, changing rainfall patterns and storage of water underground, in lakes, or in the atmosphere can affect sea levels. The three ways we know sea levels are rising are from physical tide gauges, from satellites that measure the water height, and from satellites that measure where ice is stored across the globe. While tide gauge measurements go back many years, they only measure water levels at their location. Many tide gauges have to be in place to get an accurate sense of what is happening globally. Satellites, on the other hand, are much more capable of taking global measurements. The problem with satellites is they have only been taking measurements since approximately not nearly as long as tide gauges. So scientists try to combine these two measurements to get a long-term and global picture of what is really happening. A very recent paper published in Nature has evaluated the history of sea level rise, and what they find is really interesting. The lead author John Fasullo from the National Center for Atmospheric Research and his colleagues tried to determine if the rate of sea level rise is changing. That is, are the water levels rising linearly, the same amount each year? Or, is the rate increasing faster and faster each year? Using satellite data, the authors found little evidence of an acceleration. However, they show that this is because the satellites began measuring in 1993, right after a large volcanic eruption Mount Pinatubo. This eruption temporarily reduced global warming because particles from the eruption blocked sunlight. Just by coincidence, the timing of the satellites and the eruption has affected the water rise so that it appears to be linear. Had the eruption not occurred, the rate would have increased. This allows the scientists to make a prediction: This means that the authors will be able to statistically observe an increase, even though the Earth experiences natural changes that may mask any increase. I communicated with Dr. Fasullo, asking him why this paper is so important. This article shows that the acceleration of sea level rise is real and ongoing. It is also an example of how climate models can play a key role in both the interpretation of observations and the prediction of near-future climate.

Chapter 4 : History of Sea Level | Surging Seas: Sea level rise analysis by Climate Central

The pattern of sea level change or 'fingerprint' resulting from one millimeter per year of Greenland ice melt derived from NASA GRACE measurements. The black circles show locations of the best.

This new edition of our report on Asian Americans provides data on 14 smaller Asian origin groups with population counts below 1 million in the Census, along with detailed data on the economic and demographic characteristics of adults in nine of these groups. Our original report contained survey and Census data on all Asian Americans as well as specific information on the six largest Asian origin groups. Asian Americans are the highest-income, best-educated and fastest-growing racial group in the United States. They are more satisfied than the general public with their lives, finances and the direction of the country, and they place more value than other Americans do on marriage, parenthood, hard work and career success, according to a comprehensive new nationwide survey by the Pew Research Center. A century ago, most Asian Americans were low-skilled, low-wage laborers crowded into ethnic enclaves and targets of official discrimination. Today they are the most likely of any major racial or ethnic group in America to live in mixed neighborhoods and to marry across racial lines. Asians recently passed Hispanics as the largest group of new immigrants to the United States. The educational credentials of these recent arrivals are striking. This is double the share among recent non-Asian arrivals, and almost surely makes the recent Asian arrivals the most highly educated cohort of immigrants in U.S. Compared with the educational attainment of the population in their country of origin, recent Asian immigrants also stand out as a select group. Recent Asian immigrants are also about three times as likely as recent immigrants from other parts of the world to receive their green cards or permanent resident status on the basis of employer rather than family sponsorship though family reunification remains the most common legal gateway to the U.S. The modern immigration wave from Asia is nearly a half century old and has pushed the total population of Asian Americans foreign born and U.S. born, adults and children to a record high. Asian Americans trace their roots to any of dozens of countries in the Far East, Southeast Asia and the Indian subcontinent. Each country of origin subgroup has its own unique history, culture, language, religious beliefs, economic and demographic traits, social and political values, and pathways into America. But despite often sizable subgroup differences, Asian Americans are distinctive as a whole, especially when compared with all U.S. According to the Pew Research Center survey of a nationally representative sample of 3,000 Asian Americans, conducted by telephone from Jan. 2008 to Feb. 2009, they also stand out for their strong emphasis on family. Their living arrangements align with these values. They are more likely than the general public to live in multi-generational family households. Asian Americans have a pervasive belief in the rewards of hard work. By their own lights, Asian Americans sometimes go overboard in stressing hard work. The immigration wave from Asia has occurred at a time when the largest sending countries have experienced dramatic gains in their standards of living. But few Asian immigrants are looking over their shoulders with regret. And by lopsided margins, Asian Americans say the U.S. Respondents rated their country of origin as being superior on just one of seven measures tested in the survey strength of family ties. The survey was conducted only among Asian Americans currently living in the U.S. As is the case with all immigration waves, a portion of those who came to the U.S. However, return migration rates are estimated to be lower for immigrants from Asia than for other immigrants, and naturalization rates that is, the share of eligible immigrants who become U.S. For more details, see Chapter 1. Asians in the U.S. For example, adults living in China are more satisfied with the way things are going in their country than Chinese Americans are with the way things are going in the United States. By contrast, the publics of India and Japan have a more downbeat view of the way things are going in their countries than their counterpart groups do about the U.S. Across the board, however, U.S. Asians are more likely than Asians in Asia to say their standard of living is better than that of their parents at a similar stage of life. Asians also exceed Asians in their belief that hard work leads to success in life. And while many U.S. Asians say that Asian-American parents place too much pressure on their children to do well in school, even more Chinese and Japanese say this about parents in their countries. For more details on these and other cross-national comparisons, see Chapter 4. For example, Indian Americans lead all other groups by a

significant margin in their levels of income and education. Seven-in-ten Indian-American adults ages 25 and older have a college degree, compared with about half of Americans of Korean, Chinese, Filipino and Japanese ancestry, and about a quarter of Vietnamese Americans. More than seven-in-ten Japanese and two-thirds of Filipinos live in the West, compared with fewer than half of Chinese, Vietnamese and Koreans, and only about a quarter of Indians. The religious identities of Asian Americans are quite varied. According to the Pew Research survey, about half of Chinese are unaffiliated, most Filipinos are Catholic, about half of Indians are Hindu, most Koreans are Protestant and a plurality of Vietnamese are Buddhist. Among Japanese Americans, no one group is dominant: There are subgroup differences in social and cultural realms as well. Japanese and Filipino Americans are the most accepting of interracial and intergroup marriage; Koreans, Vietnamese and Indians are less comfortable. Koreans are the most likely to say discrimination against their group is a major problem, and they are the least likely to say that their group gets along very well with other racial and ethnic groups in the U. In contrast, Filipinos have the most upbeat view of intergroup relations in the U. The Japanese are the only group that is majority U. Their pathways into the U. The Vietnamese are the only major subgroup to have come to the U. Asian Americans have varying degrees of attachment to relatives in their home countries—likely reflecting differences in the timing and circumstances of their immigration. They have different naturalization rates. Fully three-quarters of the foreign-born Vietnamese are naturalized U. History Asian immigrants first came to the U. They endured generations of officially sanctioned racial prejudice—including regulations that prohibited the immigration of Asian women; the Chinese Exclusion Act of 1882, which barred all new immigration from China; the Immigration Act of 1892 and the National Origins Act of 1924, which extended the immigration ban to include virtually all of Asia; and the forced relocation and internment of about 120,000 Japanese Americans after the Japanese attack on Pearl Harbor in 1941. Large-scale immigration from Asia did not take off until the passage of the landmark Immigration and Nationality Act of 1952. Over the decades, this modern wave of immigrants from Asia has increasingly become more skilled and educated. Today, recent arrivals from Asia are nearly twice as likely as those who came three decades ago to have a college degree, and many go into high-paying fields such as science, engineering, medicine and finance. This evolution has been spurred by changes in U. These trends have raised the education levels of immigrants of all races in recent years, but Asian immigrants exceed other race and ethnic groups in the share who are either college students or college graduates. It is not yet possible to make any full intergenerational accounting of the modern Asian-American immigration wave; the immigrants themselves are still by far the dominant group and the second generation has only recently begun to come into adulthood in significant numbers. Among all second-generation Asians, the median age is just 17; in other words, about half are still children. But on the basis of the evidence so far, this immigrant generation has set a bar of success that will be a challenge for the next generation to surpass. The two groups also have similar shares in poverty and homeownership rates. Not surprisingly, when it comes to language fluency, there are significant differences between the native- and foreign-born adults. Family formation patterns are also quite different. Among adults, the median age is 30, versus 44 for the foreign born. There are also differences between the native born and foreign born in the share of recent mothers who are unmarried. Even as births to single mothers have become more widespread in recent decades, Pew Research surveys find that a sizable majority of Americans believe this growing phenomenon has been bad for society. About one-in-five Asian Americans say they have personally been treated unfairly in the past year because they are Asian, and one-in-ten say they have been called an offensive name. Older adults are less likely than young and middle-aged adults to report negative personal experience with bias. Of those who do say it makes a difference, a slightly higher share say that members of their group are helped rather than hurt by their race. Those with less education are more prone than those with more education to say that being an Asian American is an advantage. Group Relations Overall, more than eight-in-ten Asian Americans say their group gets along either very or pretty well with whites; roughly seven-in-ten say the same about relations with Hispanics and just over six-in-ten say that about their relations with blacks. In several cities across the country, there has been a history of tension between Koreans and blacks, often arising from friction between Korean shopkeepers and black customers in predominantly black neighborhoods. Asian-American newlyweds are more likely than any other major racial or ethnic group to be

intermarried. There are notable gender differences. Asian women are twice as likely as Asian men to marry out. Among blacks, the gender pattern runs the other way—men are more than twice as likely as women to marry out. Among whites and Hispanics, there are no differences by gender. Among Asian-American newlyweds, Japanese have the highest rate of intermarriage and Indians have the lowest. More than half of recent Japanese newlyweds married a non-Asian; among recent Indian newlyweds, just one-in-eight did. Today, however, Asian Americans are much more likely than any other racial group to live in a racially mixed neighborhood. This comparison should be treated with caution: Each of the other groups is more numerous than Asians, thereby creating larger potential pools for racial enclaves. Identity Despite high levels of residential integration and out-marriage, many Asian Americans continue to feel a degree of cultural separation from other Americans. Not surprisingly, these feelings are highly correlated with nativity and duration of time in the U. In these identity preferences, Asian Americans are similar to Hispanics, the other group that has been driving the modern immigration wave. Hispanics are more likely to identify themselves using their country of origin than to identify as a Hispanic or as an American. Recent immigrants, however, tend to be somewhat less upbeat in these assessments than are immigrants who came before. By contrast, only about a third of all Americans say they are doing much better than their parents at a similar stage of life. There are only minor differences between Asian Americans and the general public in their expectations about the upward mobility of their children. On this measure, there are sizable differences among U. About a third of Koreans and Indians feel this way, as do one-in-four Chinese and Filipinos, and just one-in-five Japanese. Political and Social Attitudes Compared with the general public, Asian Americans are more likely to support an activist government and less likely to identify as Republicans. While they differ on the role of government, Asian Americans are close to the public in their opinions about two key social issues. The survey was conducted in all 50 states, including Alaska and Hawaii, and the District of Columbia.

Chapter 5 : RISE OF DEMOCRACY IN EUROPE, HISTORY TWO A-LEVEL NOTES

Sea level rise threatens not just the fort, but historic and cultural sites up and down the Atlantic Coast. Native American history, the places where slaves lived and worked, historic neighborhoods, cemeteries and sites of battles are all at risk.

Additional Resources The ocean never stops moving. When you visit the beach, waves roll in and recede and the tides rise and fall. These are small daily changes that balance out over time. But over the past century, the average height of the sea has risen more consistently—less than a centimeter every year, but those small additions add up. The rate of sea level rise has also increased over time. Between and studies show that sea level rose between 1. By , that rate had increased to about 3. Sea level is expected to rise even more quickly by the end of the century. Sea level started rising in the late s, soon after we started burning coal, gas and other fossil fuels for energy. When burned, these high-energy fuel sources send carbon dioxide up into the atmosphere. Carbon dioxide absorbs heat from the sun and traps it, warming the atmosphere and the planet. As the planet gets warmer, sea level rises for two reasons. First, warmer temperatures cause ice on land like glaciers and ice sheets to melt, and the meltwater flows into the ocean to increase sea level. Second, warm water expands and takes up more space than colder water, increasing the volume of water in the sea. Sea level rise will hit the coasts the hardest. Over the coming centuries, land that is today home to between and million coastal residents will be inundated by sea level rise associated with a 4 degree Celsius warming that will occur if we fail to curb the amount of carbon dioxide in the atmosphere. Much of this population lives in cities. Sea level rise already makes storms more dangerous, causing more flooding and damage in areas crowded with people. And it will affect different parts of the world differently, with some parts of the planet being particularly hard hit. How much water is in the oceans—and thus how high sea level is—largely depends on how much water is trapped in glacial ice. At times, there was no ice at the poles and the ocean was hundreds of feet higher than it is now; at other times, ice covered the planet and sea level was hundreds of feet lower. Scientists use sediment and ice cores to learn more about sea level before the advent of tide gauges and satellites. The artist worked with climatologists and glaciologists to make the map as accurate as possible. At that time, around 10 million square miles 26 million square kilometers of ice covered the Earth. Across the Atlantic, ice blanketed Iceland and stretched down over the British Isles and northern Europe, including Germany and Poland. The Patagonian ice sheet crept north from Antarctica to cover parts of Chile and Argentina. The climate was colder and drier globally; rain was scarce, but pockets of rainforest survived in the tropics. Low sea level meant that some land masses that are currently submerged were accessible to people. The first people to reach the Americas migrated across the land bridge and settled here. Land animals also made the journey over the bridge in both directions to colonize new continents. There has been a steady rise in carbon dioxide since the measurements began, and you can see the rise and fall on a yearly basis due to plants growing and absorbing CO₂ every spring and summer. In the annual growth rate jumped by 3. As the climate warmed as part of a natural cycle, ice melted and glaciers retreated until ice sheets remained only at the poles and at the peaks of mountains. Early on, the sea rose rapidly, sometimes at rates greater than 10 feet 3 meters per century, and then continued to grow in spurts of rapid sea level rise until about 7, years ago. Then, the climate stabilized and sea level rise slowed, holding largely steady for most of the last 2, years, based on records from corals and sediment cores. Now, however, sea level is on the rise again, rising faster now than it has in the past 6, years. The resulting rise in sea level is likely twice what we would have seen without the increase in greenhouse gasses due to human activities. Today, global sea level is inches cm higher on average than it was in Between and , global sea level rose between 0. In the s, that rate jumped to around 3. In the rate was estimated to be 3. Scientists with the Intergovernmental Project on Climate Change predict that global sea level will rise between 0. Whether it takes another or years largely depends on how quickly the ice sheets melt. Even if global warming were to stop today, sea level would continue to rise. Why is it Rising? Global warming associated with human activities causes sea level to rise in several ways. Thermal Expansion One property of water is that warm water takes up more space than cold water. So as the ocean warms from climate change , seawater expands to fill a greater volume and takes up more space. The idea that water expands when

heated seems strange, but it is a property of most objects that occurs at the molecular level. When water molecules are heated, they absorb energy. That energy causes the molecules and atoms to move around more and, in the process, take up more space. But when you have vast numbers of water molecules, like in the ocean, the tiny expansions add up to something we can see. Thermal expansion is an ongoing contributor to sea level rise as long as ocean water continues to increase in temperature. In 1992, satellites captured the calving of a large iceberg from the glacier. The iceberg was estimated to be 35 by 20 kilometers 22 by 12 miles wide. NASA Earth Observatory Glaciers and ice sheets, large land-based formations of ice, are melting as global temperatures rise. Melting ice has caused about two-thirds of the rise in sea level to date, one-third from land ice in Greenland and Antarctica and one third from melting ice on mountains. Ice sheets and glaciers in Greenland and Antarctica melt three ways: Because of this, the rate of ice melt varies from place to place as conditions change. The Arctic is warming more quickly than the Antarctic, which explains why the ice there is thinning more quickly. Many glaciers and ice sheets extend into the ocean at their coastal edge, and the floating ice is called an ice shelf. Ice shelves support ice sheets and glaciers by holding the ice on land. But as ocean temperatures increase, warm water laps at the ice shelves, weakening them and causing them to calve glaciers into the sea. This both accelerates ice melting and destabilizes land-based glaciers and ice sheets. This destabilization and acceleration has already been observed at some Greenland glaciers like Jakobshavn Isbrae, which is speeding into the sea faster than any other glacier on Earth. Pine Island Glacier, another fast-paced glacier in the Antarctic, is also changing quickly. Like this one, new discoveries about sea level change are made all the time. In the future, the melting of ice sheets will dominate sea level rise. Warming has already caused major changes in the ice sheets, continental masses of ice which hold a greater volume of ice than glaciers and ice caps combined. In addition to polar ice, the melting of mountain glaciers, like those in the Andes and Himalayas, has caused an equal amount of sea level rise to date. However, because mountain glaciers include only one percent of all land ice, polar ice will eventually greatly surpass their contributions to global sea-level rise. Other Contributions This map shows satellite data of changes in sea level rise from 1993 to 2018. The yellow and red colors indicate areas of rising sea level and the green and blue colors show areas of falling sea level. This shows how in some areas sea level will fall, although the majority of regions are facing rising seas. NASA There are other small contributions to sea level rise. Sea levels may rise in some places, and drop in others. When the ice on Greenland melts and that pull is lost the sea level in places like Iceland and Norway will actually drop. But that water will have to go somewhere. Other human impacts can decrease sea level rise, such as building dams and artificial reservoirs to store water. When people use wells to pump water from underground reservoirs, that water eventually reaches the ocean. But none of these are capable of influencing sea level to the same extent as thermal expansion and the melting of large glaciers and ice sheets. Up until 1993, tide gauges measured global sea level. Tide gauges are usually placed on piers, and they continuously record the height of the water level compared to a stable reference point on land. There are around 2,000 tide gauges around the world run by around 100 countries. Some have been recording sea level data since the 1800s and a few for even longer. But thanks to satellites, scientists have gotten a better handle on global sea level and how it has changed over time. Satellites take much more comprehensive measurements. With this information, NASA scientists calculate the average change in height almost everywhere across the globe once every 10 days. The paired satellites orbit the Earth together and are spaced roughly 100 kilometers apart. The satellites can sense the miniscule changes in the distance between one another caused by the change in gravitation force, which they measure and use to track water and ice mass change. Changing Regional and Local Sea Levels Although sea level is rising globally, in some places it is rising more quickly than others, and in some places, sea level is even falling. This type of local- and regional-scale sea level change is what is most important when talking about the impacts of sea level on people and communities and how to plan for and manage those impacts. Different places will experience varying consequences of sea level change for many reasons: Some coastal areas are positioned high above sea level—such as Scotland, Iceland, and some parts of Alaska—while others are much closer to, or even below, sea level, such as New Orleans, Louisiana and much of the eastern United States. Coasts are constantly moving and changing, with inputs from tectonic plates. Local geology can make land more resistant or prone to becoming saturated with encroaching seawater and

eroding away. When ice sheets melted at the end of the last ice age, a great weight was removed from some areas. To understand what has been happening since it helps to think of a person like an ice sheet sitting on an air mattress the land. When the person stands up the ice melts , the part of the mattress underneath and close to the person springs back up; but the parts of the mattress far from the person sink back down.

Chapter 6 : The Rise of Industrial America, | Gilder Lehrman Institute of American History

At this rate, Earth risks sea level rise of 20 to 30 feet, historical analysis shows New research finds that a vast area of Antarctica retreated when Earth's temperatures weren't much warmer.

Blog The Progressive Movement The Progressive Movement was an effort to cure many of the ills of American society that had developed during the great spurt of industrial growth in the last quarter of the 19th century. The frontier had been tamed, great cities and businesses developed, and an overseas empire established, but not all citizens shared in the new wealth, prestige, and optimism. Efforts to improve society were not new to the United States in the late s. A major push for change, the First Reform Era, occurred in the years before the Civil War and included efforts of social activists to reform working conditions and humanize the treatment of mentally ill people and prisoners. Others removed themselves from society and attempted to establish utopian communities in which reforms were limited to their participants. The focal point of the early reform period was abolitionism , the drive to remove what in the eyes of many was the great moral wrong of slavery. The second reform era began during Reconstruction and lasted until the American entry into World War I. A farm movement also emerged to compensate for the declining importance of rural areas in an increasingly urbanized America. As part of the second reform period, progressivism was rooted in the belief, certainly not shared by all, that man was capable of improving the lot of all within society. As such, it was a rejection of Social Darwinism , the position taken by many rich and powerful figures of the day. Progressivism also was imbued with strong political overtones, and it rejected the church as the driving force for change. The desire to remove corruption and undue influence from government through the taming of bosses and political machines the effort to include more people more directly in the political process the conviction that government must play a role to solve social problems and establish fairness in economic matters. The success of progressivism owed much to publicity generated by the muckrakers , writers who detailed the horrors of poverty, urban slums, dangerous factory conditions, and child labor , among a host of other ills. Progressives never spoke with one mind and differed sharply over the most effective means to deal with the ills generated by the trusts ; some favored an activist approach to trust-busting , others preferred a regulatory approach. A vocal minority supported socialism with government ownership of the means of production. Other progressive reforms followed in the form of a conservation movement , railroad legislation , and food and drug laws. The progressive spirit also was evident in new amendments added to the Constitution text , which provided for a new means to elect senators , protect society through prohibition and extend suffrage to women. Urban problems were addressed by professional social workers who operated settlement houses as a means to protect and improve the prospects of the poor. However, efforts to place limitations on child labor were routinely thwarted by the courts. The needs of African Americans and Native Americans were poorly served or served not at all â€” a major shortcoming of the progressive movement. Progressive reforms were carried out not only on the national level, but in states and municipalities. Prominent governors devoted to change included Robert M. Such reforms as the direct primary, secret ballot, and the initiative , referendum , and recall were effected. Local governments were strengthened by the widespread use of trained professionals, particularly with the city manager system replacing the frequently corrupt mayoral system. Formal expression was given to progressive ideas in the form of political parties on three major occasions:

Chapter 7 : Study Reveals Stunning Acceleration of Sea Level Rise | Climate Central

The rise of sea level since the last ice age from metres below present occurred not just around Australia but around the world, inundating significant parts of all continents.

Past changes in sea level[edit] Changes in sea level since the end of the last glacial episode See also: Past sea level Understanding past sea level is important for the analysis of current and future changes. In the recent geological past changes in land ice and thermal expansion from increased temperatures are the dominant reasons of sea level rise. This was during the last interglacial , when the earth warming was caused by slow changes in the orbital forcing. The warming was sustained over a period of thousands of years and the magnitude of the rise in sea level implied a large contribution from the Antarctic and Greenland ice sheets. The rate of rise started to slow down 8. Additionally, Earth gravitation and rotation have to be accounted for. These factors are dependent on the different layers which make up the Earth lithosphere , asthenosphere , and the order in which land-based ice melts. Because the involved processes, which are collectively known as the Sea-level equation, change very slowly, on time scales of thousands of years, they are considered to be constant. It was followed by the Ocean Surface Topography Mission on Jason-2 , and by Jason-3 Satellite measurements of sea level, in millimeters, “ April. A microwave radiometer corrects any delay that may be caused by water vapor in the atmosphere. Combining this data with the precise location of the spacecraft makes it possible to determine sea-surface height to within a few centimeters about one inch. It had caused a slight overestimation of the “ sea levels, which masked the ongoing sea level rise acceleration. In the “ period for instance, sea level rose substantially in the western tropical Pacific. In contrast to the satellite record, this record has a lot of spatial and temporal gaps. This network was used, in combination with satellite altimeter data, to establish that global mean sea-level rose Some of the recorded regional differences are due to differences in the actual sea level, while other are due to vertical land movements. In the United States for instance, considerable variation is found because some land areas are rising and some are sinking. Over the past years, the rate of sea level rise varied from an increase of about 0. The rate of sea level rise increased during the “ period compared with the longer-term average “ , although it is unclear whether the faster rate reflected a short-term variation or an increase in the long-term trend. Ice sheet dynamics Close-up of Ross Ice Shelf , the largest ice shelf of Antarctica, about the size of France and up to several hundred metres thick. There are three main contributions to sea level rise. Oceans expand if they are warming, glaciers at high altitudes melt and the total mass of ice sheets decreases. Sea level rise in the last years was dominated by retreat of glaciers and expansion of the ocean, but the contributions of the two large ice sheets Greenland and Antarctica is expected to increase in the 21st century. Much of this precipitation began as water vapor evaporated from the ocean surface. To a first approximation, the same amount of water appeared to return to the ocean in icebergs and from ice melting at the edges. Scientists previously had estimated which is greater, ice going in or coming out, called the glacier mass balance , important because a nonzero balance causes changes in global sea level. The rate of ice loss is accelerating. For instance, an average temperature increase of the entire world ocean by 0. Of course, when the ocean gains heat the water expands and this represents a component of global sea-level rise. The thermal expansion of water increases with temperature and pressure of the water. Hence, cold Arctic Ocean water will expand less for a given increase in temperature compared to warm tropical water. Because different climate models have slightly different patterns of ocean heating, they do not agree fully on the predictions for the contribution of ocean heating on sea level rise. Under the influence of global warming, melt at the base of the ice sheet increases. Simultaneously, the capacity of the atmosphere to carry precipitation increases with temperature so that precipitation, in the form of snowfall, increases. Furthermore, the additional snowfall causes increased ice flow which leads to further loss of ice. The East Antarctic Ice Sheet does not contribute much and scientists are not able to determine whether it gains or loses mass. All datasets generally show an acceleration of mass loss from the Antarctic ice-sheet, but with year-to-year variations. West Antarctica[edit] West Antarctica is currently experiencing a net outflow of glacial ice, which will increase global sea level over time. This alone was sufficient to raise the sea level at 0.

Further, thinning rates for the glaciers studied in 1990s had increased over the values measured in the early 1980s. Annual temperatures based on Byrd Station central West Antarctica from 1980 to 2000 increased linearly by 2°C. In contrast to previous studies, we report statistically significant warming [1]. A continued rise in summer temperatures could lead to more frequent and extensive episodes of surface melting of the West Antarctic Ice Sheet. The first one is the Marine Ice Sheet Instability, the bedrock on which parts of the ice sheet rest is moving deeper inland. This means that when a part of the ice sheet melts, a thicker part of the ice sheet is exposed, which may lead to additional ice loss. Secondly, melting of the ice shelves, the floating extensions of the ice sheet, leads to a process named the Marine Ice Cliff Instability. Because they function as a buttress to the ice sheet, their melt leads to additional ice flow. Melt of ice shelves is accelerated when surface melt creates crevasses and these crevasses cause fracturing. The rest of the ice on Greenland is part of isolated glaciers and ice caps. Estimates on future contribution to sea level rise from Greenland range from 0.5 to 2.5 m. After an initial period of melting, the height of the ice sheet will have lowered. As air temperature increases closer to the sea surface, more melt starts to occur. This melting may further be accelerated because the color of ice is darker while it is melting. There is a threshold in surface warming beyond which a partial or near-complete melting of the Greenland ice sheet occurs. Different research has put this threshold value as low as 1°C. Still, mountain glaciers have contributed appreciably to historical sea level rise and are set to contribute a smaller, but still significant fraction of sea level rise in the 21st century. For instance, valley glaciers that have a shallow slope already retreat under mild warming. Every glacier has a height above which there is net gain in mass and under which the glacier loses mass. If that height changes a bit, this has large consequences for glaciers with a shallow slope. However, this only holds true in the case that the salinity of the sea ice and sea water are equal. This assumption is not valid in the case of melting sea ice, where the sea ice contains less salt than sea water. Fresh water has a larger volume compared to salt water, and as such there can be a small contribution of sea ice melt. Humans impact how much water is stored on land. Building dams prevents large masses of water from flowing into the sea and therefore increases the storage of water on land. On the other hand humans extract water from lakes, wetlands and underground reservoirs for food production leading to rising seas. Furthermore, the hydrological cycle is influenced by climate change and deforestation, which can lead to further positive and negative contributions to sea level rise. In the 20th century, these processes roughly balanced, but dam building has slowed down and is expected to stay low for the 21st century. On the one hand, scientists use process-based modelling, where all relevant and well-understood physical processes are included in a physical model. An ice-sheet model is used to calculate the contributions of ice sheets and a general circulation model is used to compute the rising sea temperature and its expansion. A disadvantage of this method is that not all relevant processes might be understood to a sufficient level. Alternatively, some scientists use semi-empirical techniques that use geological data from the past to determine likely sea level responses to a warming world in addition to some basic physical modelling. Semi-empirical modelling relies on sophisticated statistical techniques. These projections are the expected changes due to thermal expansion of sea water alone, and do not include the effect of melted continental ice sheets. With the effect of ice sheets included the total rise will be larger, by an uncertain but possibly substantial factor. Their projections are based on the contributors to sea level rise, but do exclude some processes that are less understood. In the case of rapid cuts in emission the so-called RCP2.6. The higher value should thus not be read as an upper limit, which can be substantially higher. Their projection included increased contributions from the Antarctic and Greenland ice sheets. Use of two completely different approaches reinforced the Rignot projection. This could mean rapid sea level rise of up to 19 millimeters per year by the end of the century. The study also concluded that the Paris climate agreement emissions scenario, if met, would result in a median 0.5 m. For instance, Hansen et al. There is a widespread consensus that substantial long-term sea-level rise will continue for centuries to come even if the temperature stabilizes. Melting of the Greenland ice sheet could contribute an additional 4 to 7 m. In a study published by Nature, the entire state of Delaware could be completely wiped out by 2100. This is caused by both unsustainable extraction of groundwater in some places also by extraction of oil and gas, and by levees and other flood management practices that prevent accumulation of sediments from compensating for the natural settling of deltaic soils. This has consequences for Europe and the U.S. East Coast, which may

receive a sea level rise 3-4 times the global average. Regional effects of global warming Map of major cities of the world most vulnerable to sea level rise Current and future climate change is set to have a number of impacts, particularly on coastal systems. Such impacts include increased coastal erosion, higher storm-surge flooding, inhibition of primary production processes, more extensive coastal inundation, changes in surface water quality and groundwater characteristics, increased loss of property and coastal habitats, increased flood risk and potential loss of life, loss of non-monetary cultural resources and values, impacts on agriculture and aquaculture through decline in soil and water quality, and loss of tourism, recreation, and transportation functions. River deltas and small island states are particularly vulnerable to sea-level rise. Globally tens of millions of people will be displaced in the latter decades of the century if greenhouse gases are not reduced drastically. Many coastal areas have large population growth, which results in more people at risk from sea level rise. The rising seas pose both a direct risk: Asia has the largest population at risk from sea level with countries such as Bangladesh, China, India, Indonesia, and Vietnam having very densely populated coastal areas. Due to flooding and salt water intrusion into the soil, the salinity of agricultural lands near the sea increases, posing problems for crops that are not salt-resistant. Furthermore, salt intrusion in fresh irrigation water poses a second problem for crops that are irrigated. Newly developed salt-resistant crop variants are currently more expensive than the crops they are set to replace.

Chapter 8 : Ancient Aboriginal stories preserve history of a rise in sea level

Still, mountain glaciers have contributed appreciably to historical sea level rise and are set to contribute a smaller, but still significant fraction of sea level rise in the 21st century. The roughly , glaciers on earth are spread out across all continents. [56].

The term reflected the combination of outward wealth and dazzle with inner corruption and poverty. They stress greed, scandals, and corruption of the Gilded Age. They set in motion developments that would shape the country for generations—the reunification of the South and North, the integration of four million newly freed African Americans, westward expansion, immigration, industrialization, urbanization. It was also a period of reform, in which many Americans sought to regulate corporations and shape the changes taking place all around them. A compromise gave Hayes the presidency in return for the end of Reconstruction and the removal of federal military support for the remaining biracial Republican governments that had emerged in the former Confederacy. With that agreement, Congress abandoned one of the greatest reforms in American history: The United States thus accepted a developing system of repression and segregation in the South that would take the name Jim Crow and persist for nearly a century. The freed people in the South found their choices largely confined to sharecropping and low-paying wage labor, especially as domestic servants. Although attempts at interracial politics would prove briefly successful in Virginia and North Carolina, African American efforts to preserve the citizenship and rights promised to black men in the Fourteenth and Fifteenth Amendments to the Constitution failed. The West Congress continued to pursue a version of reform in the West, however, as part of a Greater Reconstruction. The federal government sought to integrate the West into the country as a social and economic replica of the North. Land redistribution on a massive scale formed the centerpiece of reform. Through such measures as the Homestead and Railroad Acts of , the government redistributed the vast majority of communal lands possessed by American Indian tribes to railroad corporations and white farmers. To redistribute that land, the government had to subdue American Indians, and the winter of saw the culmination of the wars that had been raging on the Great Plains and elsewhere in the West since the end of the Civil War. Following the American defeat at the Battle of the Little Bighorn the previous fall, American soldiers drove the Lakota civil and spiritual leader Sitting Bull and his followers into Canada. They forced the war leader Crazy Horse to surrender and later killed him while he was held prisoner. Sitting Bull would eventually return to the United States, but he died in at the hands of the Indian police during the Wounded Knee crisis. The defeat of the Lakotas and the utterly unnecessary Nez Perce War of ended the long era of Indian wars. There would be other small-scale conflicts in the West such as the Bannock War and the subjugation of the Apaches, which culminated with the surrender of Geronimo in , but these were largely police actions. The slaughter of Lakota Ghost Dancers at Wounded Knee in did bring a major mobilization of American troops, but it was a kind of coda to the American conquest since the federal government had already effectively extended its power from the Atlantic to the Pacific. The treaty system had officially ended in , but Americans continued to negotiate agreements with the Indians. The goal of these agreements, and American land policy in general, was to create millions of new farms and ranches across the West. Not satisfied with already ceded lands, reformers—the so-called "Friends of the Indians" whose champion in Congress was Senator Henry Dawes—sought to divide reservations into individual farms for Indians and then open up most or all of the remaining land to whites. The Dawes Act of became their major tool, but the work of the Dawes Commission in extended allotment to the Creeks, Cherokees, Seminoles, Chickasaws, and Choctaws in Indian Territory, which became the core of the state of Oklahoma. Land allotment joined with the establishment of Indian schools and the suppression of native religions in a sweeping attempt to individualize Indians and integrate them one by one into American society. The policy would fail miserably. Indian population declined precipitously; the tribes lost much of their remaining land, and Indians became the poorest group in American society. Immigration Between and immigrants prompted much more concern among native-born white Americans than did either black people or Indian peoples. During these years there was a net immigration of approximately 7., people into the United States. During roughly the same

period, the population of the country increased by about 27 million people, from about 49 million in to 76 million in . Before the immigrants came largely from Western Europe and China. Taking the period between and as a whole, Germans comprised 28 percent of American immigrants; the British comprised 18 percent, the Irish 15 percent, and Scandinavians 11 percent. Together they made up 72 percent of the total immigration. At the end of the century, the so-called "New Immigration" signaled the rise of southern and eastern Europe as the source of most immigrants to America. The influx worried many native-born Americans who still thought of the United States as a white Protestant republic. Many of the new immigrants did not, in the racial classifications of the day, count as white. As the century wore on, they were increasingly Catholic and Jewish. Immigrants entered every section of the country in large numbers except for the South. They settled in northeastern and midwestern cities and on western and midwestern farms. The Pacific and mountain West contained the highest percentage of immigrants of any region in and . The immigrants forged networks that shaped how and where they migrated and the kinds of communities they established. Chain migrations linked migrants to prior migrants. Early arrivals wrote home to bring family, friends, and neighbors to the United States. Over large swaths of Minnesota, the Dakotas, and elsewhere German was the primary language of daily life. Tensions between immigrants and the native born over the language to be spoken in public schools, Sunday closures of businesses sabbatarianism , and temperance reform often put cultural issues and practices at the center of local and state politics. Taken together, immigration and the end of Reconstruction triggered an anti-democratic movement to restrict access to the ballot box. They advocated restrictions on voting as a way to check corruption, elevate political culture, and marginalize thoseâ€”they had in mind immigrants and blacksâ€”whom they thought incapable of meeting the obligations of republican politics. They sought political changes that would make it far more difficult for the poor and immigrants to vote. Over time, through poll taxes, residence requirements, literacy requirements, and more, they would succeed. The mass politics and high voting rates characteristic of late nineteenth-century America would not outlive the era. Attempts to restrict suffrage were part of a strong political and social backlash against immigrants that developed over the course of the century. The United States welcomed immigrants because they were essential to its growing economy, but nativists opposed immigrants as antithetical to American culture and society. They thought of immigrants as exotic and inassimilable. In certain situations, however, nativists had allies who were immigrants or the children of immigrants. Workers, both immigrant and native born, often feared that corporations were using contract laborâ€”workers recruited abroad at lower wages than those paid American workersâ€”to undermine American working conditions and the American family, which they defined as a working man whose wife maintained the home. They opposed certain kinds of immigration. One of the forgotten reforms of the period, the Foran Act of , outlawed contract labor, but the law proved difficult to enforce. Alliances of some native-born Americans with some immigrants against other immigrants proved most effective in the case of the Chinese. Roughly , Chinese immigrated to the United States between and , and they became the personification of both the inassimilable immigrant and the contract worker. Although the Chinese came as free laborers, they were often branded as coolies: Racists had previously claimed that superior Anglo-Saxons would inevitably replace "inferior" races. But in the West, while Sinophobes saw the Chinese as exotic and inferior, they also thought the Chinese would triumph over the supposedly superior white men because they were efficient workers. Immigrants and the native born formed mobs that attacked the Chinese at Rock Springs, Wyoming, in and expelled them from Tacoma, Washington, in and Seattle in . Congress passed ten-year restrictions on Chinese immigration in and and a permanent exclusion act in . Late in the nineteenth century, those who opposed immigration from Italy, Hungary, and elsewhere compared those groups to the Chinese. Some immigrants could wrap themselves in the mantle of Americanism if they were "white" and Protestant. Protestant immigrants, particularly Scandinavians and Scots-Irish, joined the American Protective Association in to restrict Catholic immigration as it rode a larger wave of anti-Catholicism that swept over the country. Aimed initially at Irish and Catholic schools, anti-Catholicism increased its range as new Catholic immigrants began to arrive. Agricultural, Commercial, and Industrial Development Although not all of them intended to stay, most immigrants came to the United States for economic opportunity. Cheap land and relatively high wages, compared to their home countries, were available regardless of citizenship.

The Homestead Act did not require that settlers filing for land be American citizens, and the railroads not only sold their land grants cheaply, they advertised widely in Europe. The results of this distribution of fertile and largely accessible land were astonishing. Everything in the late nineteenth century seemed to move faster than ever before. Americans brought more land under cultivation between and million acres than they had since the English first appeared at Jamestown in million acres. Farmers abandoned small, worn-out farms in the East and developed new, larger, and more fertile farms in the Midwest and West. They developed so much land because they farmed extensively, not intensively. In terms of yields per acre, American farmers ranked far below Europe. Maintaining fertility demanded labor, which was precisely what American farmers were bent on reducing. They invested not in labor but in technology, particularly improved plows, reapers, and threshers. With westward expansion onto the prairies, a single family with a reaper could increase acreage and thus production without large amounts of hired labor. Arable free lands grew scarcer during the s, forcing more and more land seekers west into arid lands beyond the 98th meridian. In many years these lands lacked adequate rainfall to produce crops. The expansion of agricultural lands led to what superficially seems a paradox: During the same period, the percentage of workers employed in agriculture fell. Such statistics seemed to reflect a decline in the importance of farming, but in fact, they reflected its significance and efficiency. Farmers produced more than the country could consume with smaller and smaller percentages of its available labor. They exported the excess, and the children of farmers migrated to cities and towns. Where at the beginning of the century exports composed about 10 percent of farm income, they amounted to between 20 and 25 percent by the end of the century. Migration from rural to urban areas dwarfed both foreign migration and westward migration. The rise of industrial America, the dominance of wage labor, and the growth of cities represented perhaps the greatest changes of the period. Few Americans at the end of the Civil War had anticipated the rapid rise of American industry. As the Massachusetts Bureau of Statistics and Labor declared in , wage labor was universal: The relatively high wages for skilled workers led employers to seek ways to replace skilled with unskilled or semi-skilled workers. Mechanization provided the best tactic for deskilling work and lowering wages. Many of the bitterest strikes of the period were attempts to control working rules and to maintain rather than raise wages. Beginning with the Great Railroad Strike of , through the Great Upheaval of that culminated in the slaughter at Haymarket Square, then through the Homestead Strike , Pullman Strike , and more, the largest confrontations often involved violence and the intervention by state or federal governments to repress the strikes. Railroads Many of these strikes involved the railroads; the whole economy seemed to revolve around the railroads. At the end of the s the railroads renewed their expansion. With a brief break in the s, expansion continued at a reckless pace until

Chapter 9 : Is sea level rising?

Sea level rise is caused primarily by two factors related to global warming: the added water from melting ice sheets and glaciers and the expansion of seawater as it warms. The first graph tracks the change in sea level since as observed by satellites.

Evaporation and precipitation if due to a long-term pattern Local effect Changes through geologic time [edit] Sea level has changed over geologic time. As the graph shows, sea level today is very near the lowest level ever attained the lowest level occurred at the Permian - Triassic boundary about million years ago. Most of this had melted by about 10, years ago. Geologists who study the positions of coastal sediment deposits through time have noted dozens of similar basinward shifts of shorelines associated with a later recovery. This results in sedimentary cycles which in some cases can be correlated around the world with great confidence. This relatively new branch of geological science linking eustatic sea level to sedimentary deposits is called sequence stratigraphy. The most up-to-date chronology of sea level change through the Phanerozoic shows the following long-term trends: Sea level rise since the last glacial maximum[edit] Further information: Early Holocene sea level rise During deglaciation between about 19â€”8 ka, sea level rose at extremely high rates as the result of the rapid melting of the British-Irish Sea, Fennoscandian, Laurentide , Barents-Kara , Patagonian , Innuitian ice sheets and parts of the Antarctic ice sheet. During the rest of the early Holocene, the rate of sea level rise varied from a low of about 6. They are Meltwater pulse 1A between circa 14, and 14, calendar years ago; Meltwater pulse 1B between circa 11, and 11, calendar years ago; and Meltwater pulse 1C between 8, and 7, calendar years ago. Meltwater pulse 1A was a In sharp contrast, the period between 14, and 11, calendar years ago, which includes the Younger Dryas interval, was an interval of reduced sea level rise at about 6. Meltwater pulse 1C was centered at 8, calendar years and produced a rise of 6. The primary source may have been meltwater from the Antarctic ice sheet. Other studies suggest a Northern Hemisphere source for the meltwater in the Laurentide ice sheet. Late Holocene rates of sea level rise have been estimated using evidence from archaeological sites and late Holocene tidal marsh sediments, combined with tide gauge and satellite records and geophysical modeling. For example, this research included studies of Roman wells in Caesarea and of Roman piscinae in Italy. These methods in combination suggest a mean eustatic component of 0. For example, geological observations indicate that during the last 2, years, sea level change was small, with an average rate of only 0. This compares to an average rate of 1. Both curves are adjusted to the ICS geologic timescale. Quaternary Sea-Level Changes, â€” An exceptionally long interglacial ahead? Uses authors parameter link A. Uses authors parameter link M. Berger, "Futurew Climatic Changes: Retrieved 25 April