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Erosion of the Weald, Southeast England

Part II: A Flood Explanation of the Mystery and Its Implications

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Abstract

After describing the failures of uniformitarian geologists to explain the geomorphology of the Weald (Oard and Matthews, 2015), we now present an explanation using a Flood geology paradigm. Seven key geomorphological features of the Weald have to be simultaneously explained: (1) the volume of the erosion; (2) the pattern producing erosion surfaces, ridges, crenulations, and water and wind gaps; (3) evidence for river capture; (4) underfit water gaps; (5) range of dry valleys; (6) the origin of clay-with-flints; and (7) the origin of the duricrusts and sarsen stones. We identify the uniformitarian assumptions that have led to the failure of their theories. Replacing these assumptions with a Flood-geology model allows us to provide an explanation for these seven challenging features.

Introduction

The Weald of southeast England is an eroded anticline. An estimated minimum of 1,300 m (4,260 feet) of erosion occurred at the center of the anticline, which covers an area ~200 km (125 miles) east-to-west by ~55 km (35 miles) north-to-south. The North and South Downs represent the eroded north and south limbs of this anticline, respectively. The dip of the North and South Downs is generally 1° to 5° away from the center, with inward-facing escarpments as either cliffs or steep embankments, like those seen in the gap in the South Downs at Amberley on the river Arun (Figure 1).

There are a significant number of other water and wind gaps that cut through the North Downs and South Downs, perpendicular to the escarpments. The center of the Weald is eroded down to the Purbeck Limestone. Although there are several erosional remnants within the central portion of the Weald, it is relatively flat in many places. The structure defined by shading, the gaps, and the rivers are shown in Figure 2.

In Part I, we described the geomorphology of the Weald and several of the popular uniformitarian interpretations of its origin (Oard and Matthews, 2015). In this part, we first note seven major geomorphological features of the Weald that must be explained and show how the uniformitarian models have failed to explain anything more than the odd isolated feature. We suggest that the problem is the uniformitarian para-

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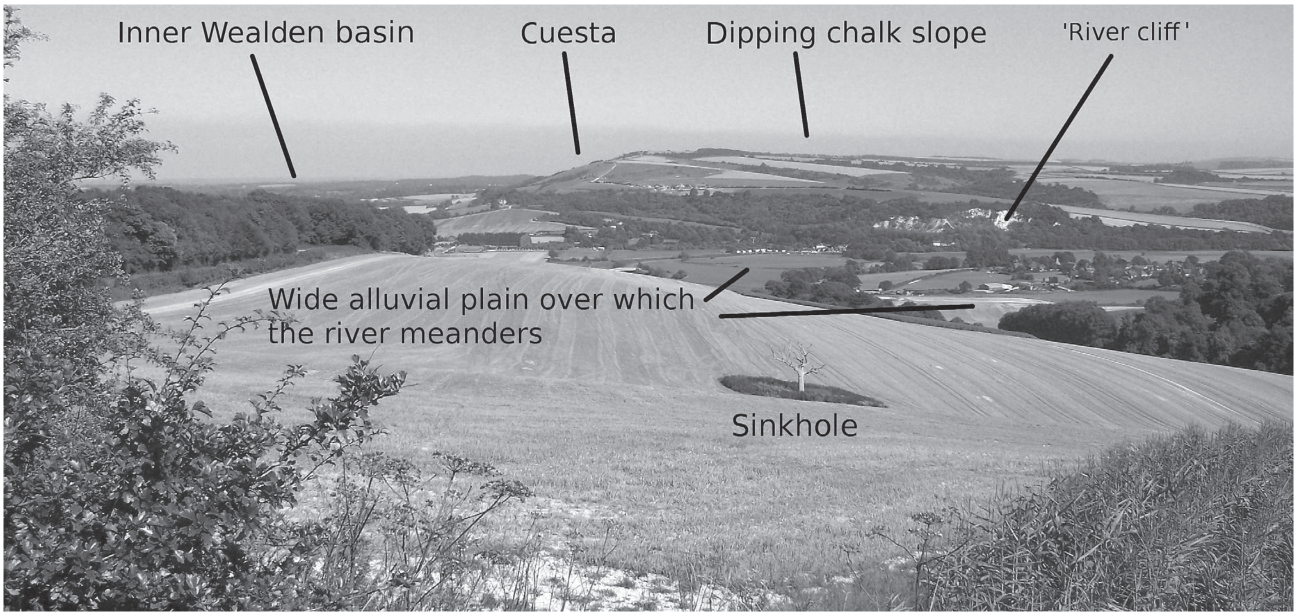

Figure 1. Erosion surface on the top of the South Downs on the dipping chalk slope. View east across the Arun water gap. Notice the shape of the South Downs on the other side of the water gap, showing the cuesta (steep slope) on the north side and the gently southward dipping erosion surface towards the south.

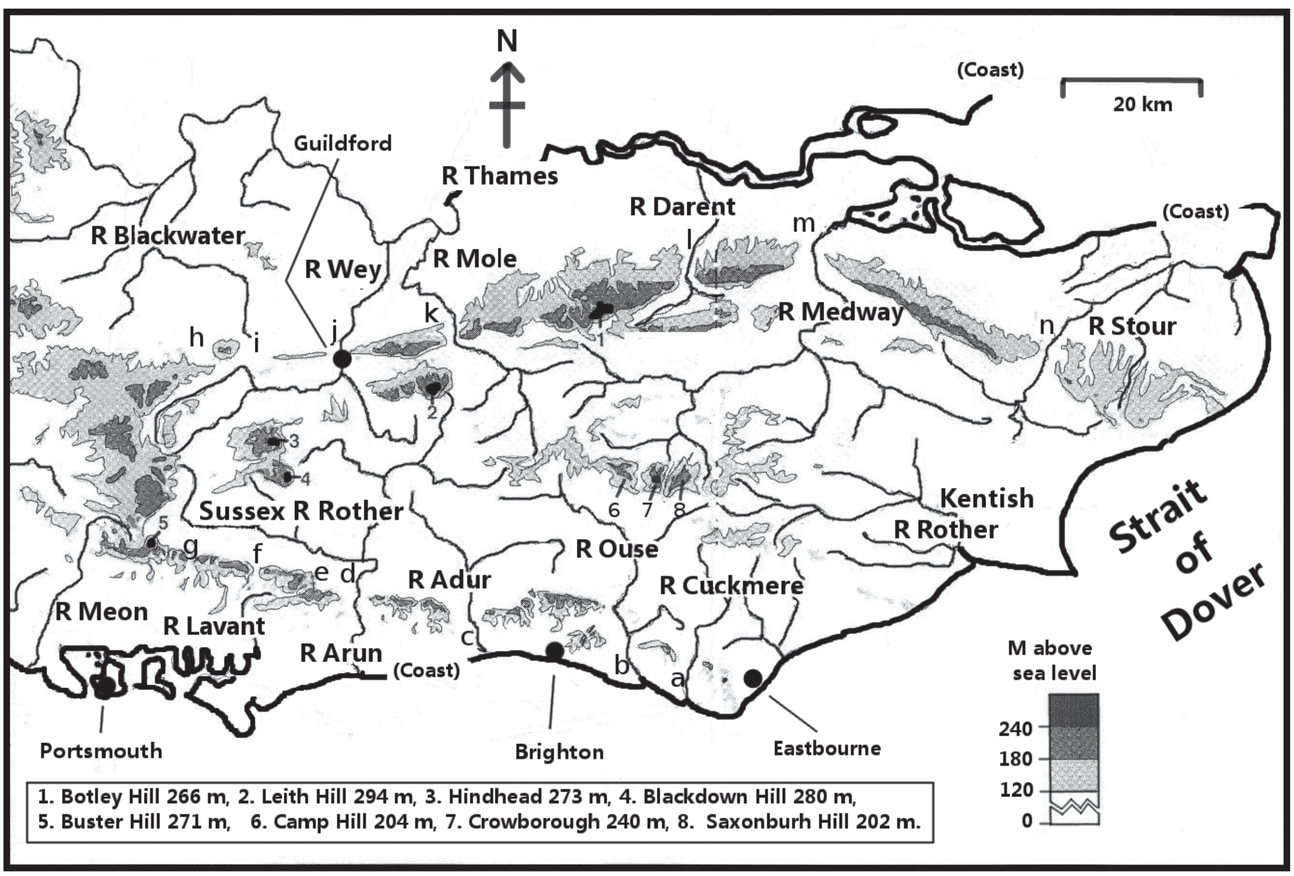

Figure 2. Map of the Weald by grayscale elevation above mean sea level with eight well-known high areas or erosional remnants showing important cities and rivers (modified from Jones, 1999b, p. 27).

digm and attempt to demonstrate that the Flood paradigm adequately explains the major geomorphologic features.

In our paradigm, we propose that the Weald landscape developed during the retreat of the Floodwaters. Three overlapping stages are identified: (1) major sheet flow to the south and east during the elevation of the UK relative to the new ocean basins, (2) uplift of the Weald anticline causing accelerated erosion along its crest, and (3) formation of a "Flood lake" that gradually drained, forming wind and water gaps. Major erosion surfaces and the transport of gravel ("clay-with-flints") occurred during the first phase. Changes in water chemistry largely explain the silcrete.

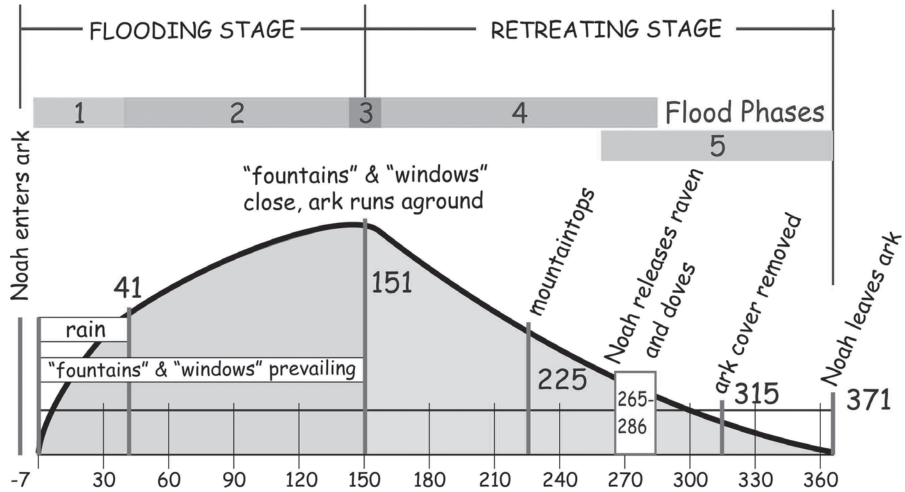

Figure 3. Graph of relative sea level for the two stages and five phases in Walker's biblical geological model of the Flood (drawn by John Reed).

The Need for Another Paradigm

Why do we need another paradigm or hypothesis? For almost 200 years secular geologists have tried to explain the pattern of erosion of the Weald (Oard and Matthews, 2015). Jones (1999a) discussed three major models that focus on the erosion surfaces, but there are different problems with each one, especially in providing comprehensive explanations. All these models assume uniformitarianism, or "the present is the key to the past," in spite of its many problems (Reed and Williams, 2012). Uniformitarianism took geology away from biblical natural history, but ironically it cannot be justified, because it explains little of the geomorphology of Earth's surface, including, of course, the Weald:

> It became increasingly evident after 1960 that no satisfactory understanding of geomorphological processes existed.… The most far-reaching implication arises from the recognition that almost all landforms are relics [i.e., formed in the past] and have not been shaped only, or even largely, by present-day processes. (Green, 1980, pp. 252, 255, brackets added)

If landforms formed in the past by processes not operating today, the uniformitarian principle is contradicted, and we are therefore entitled to reconsider the Flood. The classification of the Flood into stages and phases (Walker, 1994) provides our starting point. The major consideration we would propose is that landforms of the earth were shaped by global processes of the past that are no longer operating, particularly the retreating stage of the Flood (Figure 3).

No explanation can be considered successful unless it explains all the major geomorphological features of the Weald. We identify seven major features (Figure 4):

1. The large volume of erosion, especially considering the limited erosion in the adjacent London Basin to the north and Hampshire-Dieppe Basin to the south
2. The patterns of erosion that resulted in (a) the major erosion surfaces, (b) the ridges, (c) the crenulations, (d) the water gaps, and (e) the wind gaps
3. The examples of "river capture"
4. The overfit river gaps, where narrow

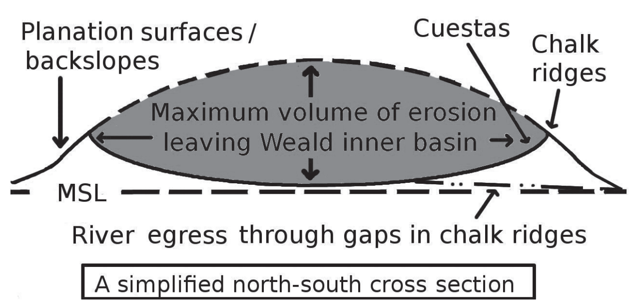

Figure 4. A simplified north-south cross section of the Weald showing most of the major features needing an explanation.

rivers meander across wide alluvial plains, bordered by significant "river cliffs"

5. The many dry valleys
6. The clay-with-flints
7. The silcrete duricrust and sarsen stones

Our model differs significantly from those proposed by uniformitarians in the following respects:

1. Uplift occurred in days, not millions of years, generating eroding currents of high velocity.
2. Minor erosion that resulted in a "Weald island" surrounded by a Pliocene sea (Wooldridge, 1952) is thereby ruled out.
3. The geological column is not an accurate means to correlate time in the past.
4. Erosion of the cuestas (Figure 5) into crenulations/side valleys was not caused by present-day-scale tidal withdrawal processes on beaches.
5. Major fracturing and faulting cannot be ignored at any stage in the model.
6. The total three-dimensional nature of the Weald has to be part of the full model rather than limiting the model to a two-dimensional north-south cross section.

Figure 5. Escarpment of the South Downs (view southwest from near the Adur water gap).

The Weald Sediments

In order to explore our erosional Flood-retreat model, we need briefly to discuss the sediments described in Part I and their emplacement. A key factor to note is that the sediments that comprised the uneroded Weald anticline could have been deposited only during the early stages of the Flood. That puts a limit on the time for the subsequent erosional events, which is much shorter than the millions of years of uniformitarianism. Similarly, any attempt to explain the Wealden sedimentation as a post-Flood event fails. This would include the recolonization model (Reed et al., 2009; Tyler, 2006).

There are three specific features of the sediments that point to Flood deposition. First, several oil and gas fields in the greater Wealden area (Butler and Pullan, 1990) suggest reservoirs deposited during the Flood (Matthews, 2008), probably during Phase 2 of Walker's (1994) model (Figure 3). Second, extensive chalk in the area prior to erosion is better explained by Flood conditions (Matthews, 2009a)—deposited in Phase 2 or Phase 3 and eroded during 4 and 5. Third, dinosaur tracks are found in the Jurassic Purbeck Limestone farther west, indicating early Flood deposition (Oard, 2011). Since those rocks are continuous with those in the Weald anticline, they also probably were laid down during Phase 1 or 2 but certainly not later than Phase 3.

The Basic Erosion Explained

The development of the present Weald landscape from the emergent anticline would have occurred later in the Flood, during the differential vertical movement implied in Psalm 104:6–9 (Oard, 2008, 2013). As water drained into new ocean basins, differences in topography and vertical movement rates would have caused the water to flow episodically and often at high velocity, causing significant erosion. A simple paleo-reconstruction of the Weald strata shows that Wealden sediments were roughly horizontal prior to the uplift. Neither the chalk nor the lower layers had formed a preexisting anticline. The depth of water at that time could have been several hundreds of meters (Rayner, 1981), and there is no field-based reason to challenge that uniformitarian estimate (Matthews 2009a).

Walker's (1994) model suggests a period of sheet flow (wide currents), followed by channelized flow. However, that simple theory would have been scale-dependent and so much more complex in reality. Since the withdrawal of water was certainly episodic locally (Matthews 2009b; Snelling 2009), there would have been periods when sheet flow on a smaller scale would have been dependent on local uplift rates. Renewed differential erosion could likewise have led to channelized flow in those areas, and even possible cyclic

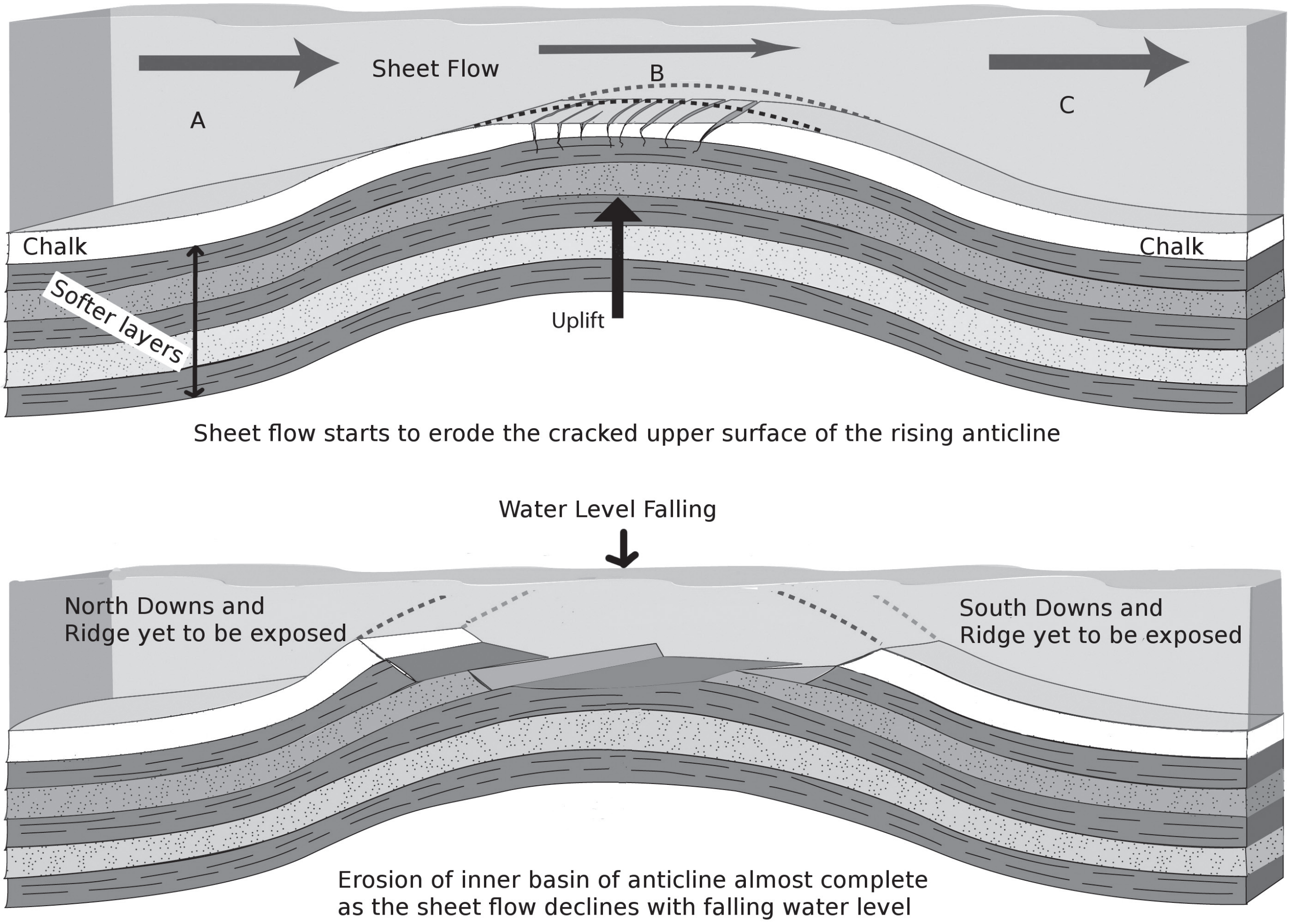

Figure 6. A block diagram showing the erosion of an anticline by Floodwater (drawn by Peter Klevberg). The cracking and brecciation of the center aids rapid erosion.

repetition between sheet and channel flow.

Oard (2008) discussed the general case of anticline erosion based on Walker's (1994) model. Figure 6 shows that sequence adapted to the Weald. England and Wales appear to have emerged from the Floodwaters due to doming in the Irish Sea region (Matthews, 2013). Initial high-velocity sheet flow, probably flowing southeast to south-southeast, would have caused deep erosion over extensive areas of the chalk that covered much of the UK. Figure 6 (top) shows water moving from the left. It was probably carrying eroded clasts of flint and sand from a broad area of Wales and England and could have carried a high dissolved load of ions since the water had recently emerged from the fountains of the great deep. Some of that load would have been deposited in the region marked "A" as clasts and precipitates. In region "B," flow would have been constricted by the rising anticline, resulting in higher current velocities. This, combined with fracturing chalk across the crest of the anticline, would have resulted in even more extensive erosion. Once the harder chalk had been removed, softer underlying sediments would have been deeply eroded along the anticlinal crest (Figure 6, bottom). Returning to the top frame, velocity would have dropped in region "C," leaving a lag of flint nodules and finer-grained sediments. This simple alternative model to uniformitarianism has thus far explained several key features, including the local volume of erosion, major erosional surfaces, ridges, and the "clay-with-flints," which are challenges 1, 2a, 2b, and 6.

River	Location	Ht (m)	Area (km²)	Mean flow	Max winter	Max summer	Min winter	Min summer
Ouse *	Barcombe Hill	5	400	3.48	100	4	1	0.1
Gt Stour	Horton	12	350	3.16	25	3	2	0.6
Cuckmere	Sherman	3	135	1.32	50	0.5	0.4	0.01
Darent	Otford	60	100	0.64	10	0.7	0.2	0.05
Darent	Lullingstone	45	120	0.72	5	1	0.2	0.02
Rother 2	Udiam	2	210	2.3	50	1	0.5	0.05
Darent	Hawley	11	190	0.64	5	1	0.05	0
Wandle	S Wimbledon	10	175	1.83	7	2	0.8	0.2
Hogsmill	Ewell	30	35		0.2	0.07	0	0
Mole	Esher	10	470	5.44	70	4	2	0.4
Mole – main gap *	Castle Hill	39	320	3.73	50	3	1	0.6
Thames	Walton	9	9290	55.6	300	40	30	6
Wey	Weybridge	9	1010	7.17	60	5	4	2
Wey – N	Farnham	64	190	0.77	10	0.5	0.4	0.1
Wey – N+S	Tilford	48	400	3.22	50	3	1.5	0.6
Bourne	Adlestone	11	90		10	0.6	0.6	0.1
Blackwater	Farnborough	67	35	0.5	4	0.4	0.4	0.04
Loxwood/Arun	Drungewick	13	90	1.15	50	0.5	0.2	0.01
Kird/Arun	Tanyards	9	67	0.85	20	0.1	0.1	0
Arun	Pallingham	4	380	3.92	50	3	1	0.1
Arun	Alfordean	21	140	1.72	50	1	0.5	0.05
Rother 1	Hardham	4	350	4.45	50	5	2	0.6
North/Arun	Brookhurst	23	54	0.57	10	0.6	0.1	0
Adur	Hatterell Bridge	4	110	1.1	10	1	0.1	0
Adur E	Sakeham	3	93	1.28	20	1	0.3	0.01

Table 1. River flow data taken from locations reported by the National Rivers Authority (NRA) in m^3/s. The height of the station is shown, along with the NRA estimate of the drainage area. The river Thames is included for comparison. For our purposes it would be ideal if those recording stations were in the water gaps, but most are not. Exceptions are shown by an *. The mean flow is an average over 20+ years. Some of the data has been plotted on Figure 7. Further notes: The river Arun does not include the Sussex river Rother, which at Hardham would add another 4.45 m^3/s for a total at the water gap of 8.37 m^3/s. The river Adur is missing an additional 1.1 m^3/s for a total of about 2.38 m^3/s.

The synclines adjacent to the Weald, the London basin (north) and the Hampshire-Dieppe basin (south), must have formed in tandem with the rise of the anticline, maintaining a subsurface balance of rock during the rheological flow of rock into the anticline, as suggested by their similar western extent, which, in turn, suggests related tectonic conditions. We will return to this and its impact on sheet and channel flow after addressing the wind and water gaps, which uniformitarian scientists also find so difficult to explain.

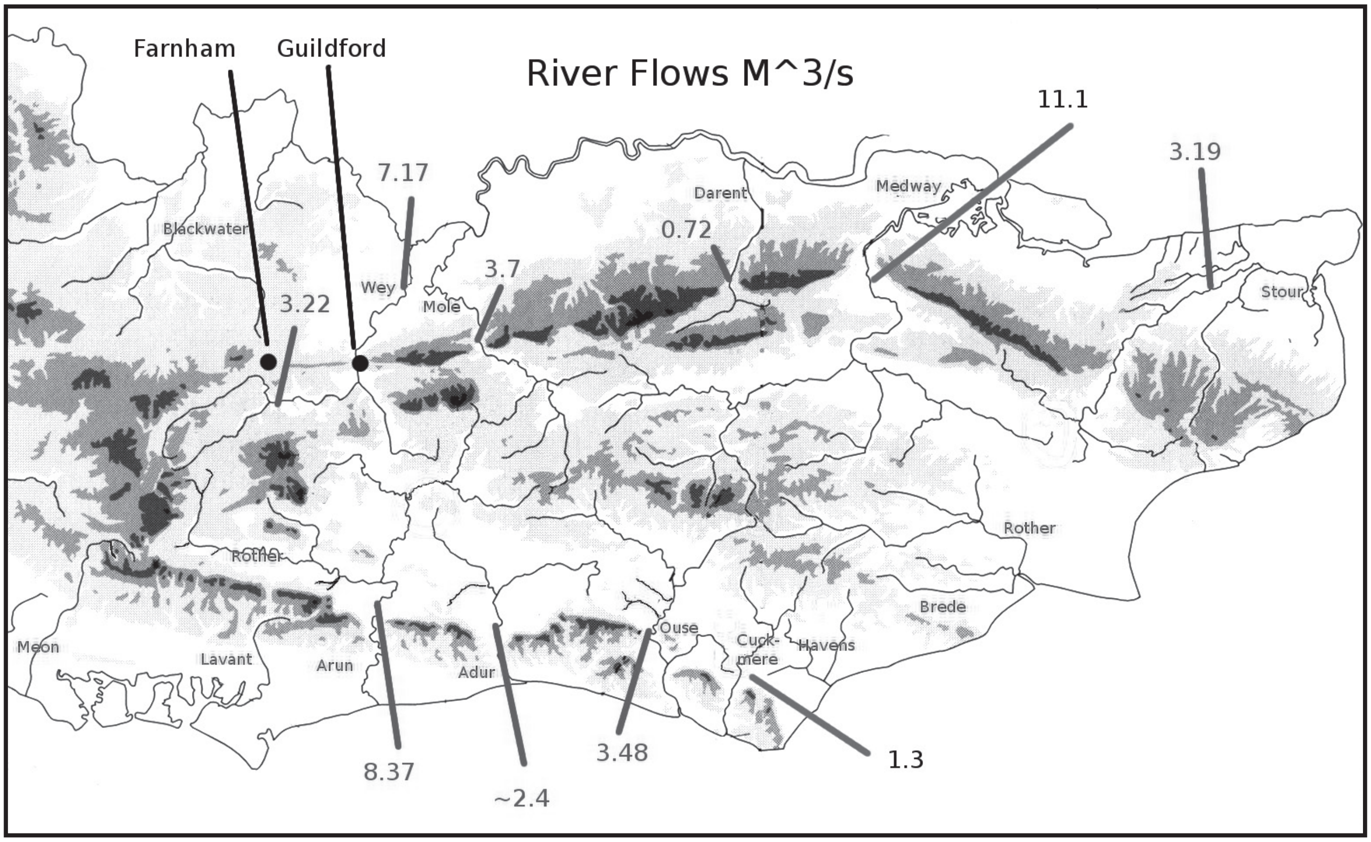

Figure 7. Average river flow through some of the water gaps in m³/s.

The Water and Wind Gaps Described

Starting in the eastern section of the South Downs and moving clockwise around the edge of the anticline (Figure 2), we summarize Wealden water gaps (Table I). Figure 7 is a plot of several of these water gaps. The rivers Cuckmere (gap a) and Ouse (gap b) pass through the eastern end of the South Downs in water gaps. Next, and of particular interest, are the Adur (gap c, Figure 2) and Arun (gap d, Figure 2) water gaps through the central portion of the South Downs, which are very similar in width at both the 80 m (262 ft) and 160 m (525 ft) contours (cf. Figures 7 and 8 in Oard and Matthews, 2015). Yet the river Arun has a present flow rate almost four times that of the river Adur (Table I, Figure 6) due to different drainages. Similarity in the gaps suggests erosion by something other than the present rivers and points to channelized Flood currents.

The rivers Meon and Lavant start on the southwestern edge of the South Downs and flow south. There are wind gaps close to their headwaters (locations e and f, Figure 2). The Sussex river Rother drains the area in the Weald north of the wind gaps, eventually joining the river Arun.

The river Blackwater does not originate in the Weald either but is associated with the lower ridge between Farnham and Guildford. Because of the wind gap near the Blackwater and the extensive drainage basin of the river Wey to the west, uniformitarians think the Wey captured the Blackwater (Dines and Edmunds, 1929). "River capture" is thought to occur when one stream/river erodes through a ridge and captures another stream (Figure 8). However, this theory has numerous problems (Oard, 2008, 2013), and the Flood-geology alternative can explain the apparent examples in the Weald (challenge 3 above in the section on the need for another paradigm). One obvious problem is that the same logic that proposes that the Blackwater was originally sourced in the inner Weald basin until "captured" by the Wey can be used to infer the "capture" of the Meon and Lavant by the Arun. No answer to this problem is forthcoming in the literature.

Moving east, the river Wey (gap j, Figure 2) has long stretches where it runs parallel to the ridges within the

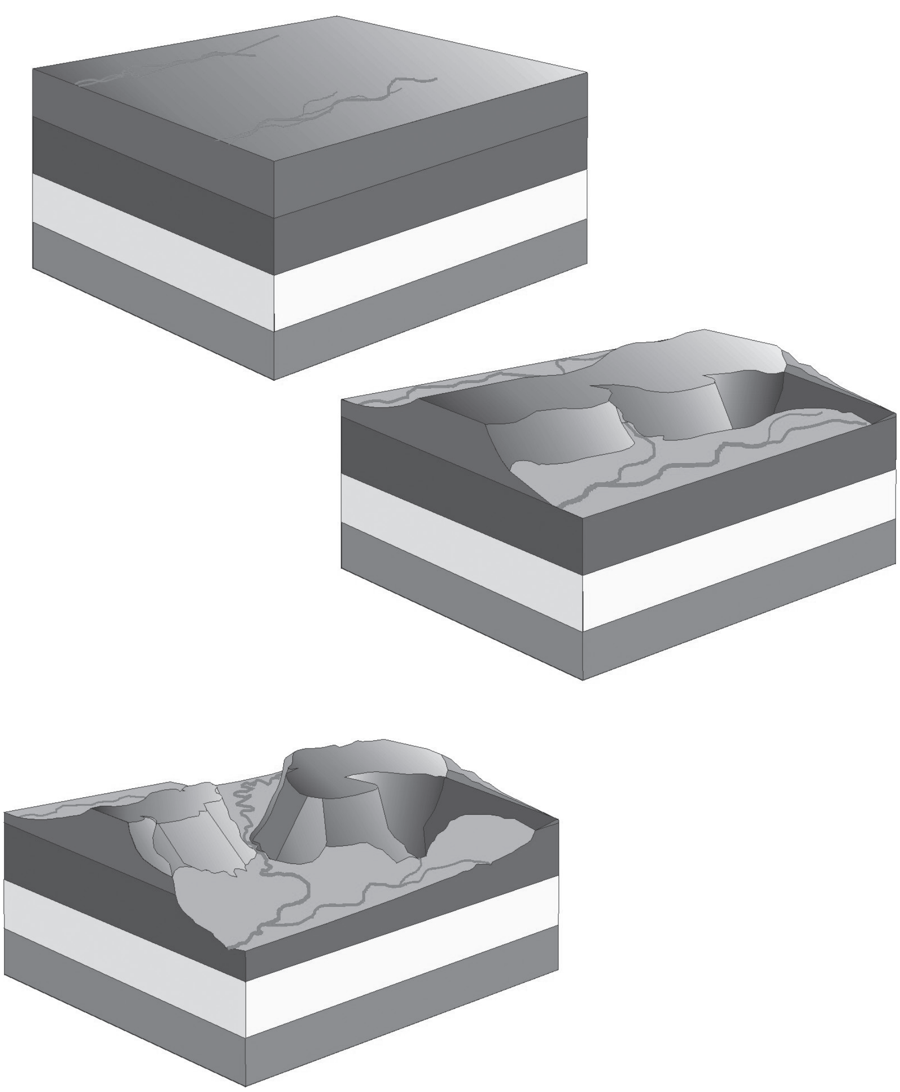

Figure 8. Schematic of stream piracy (drawn by Peter Klevberg). As the stream valleys erode, a tributary stream supposedly erodes through the intervening ridge and eventually captures part of the stream on the other side of the divide.

Weald, but then it exits the North Downs through a water gap at Guildford. The rivers Mole and Darent pass through major water gaps (k and j respectively, Figure 2) through the North Downs. The Darent has two main tributaries that originate and flow parallel to the ridges before joining and exiting the Weald.

The river Medway (gap m) drains a significant portion of the northeastern Weald. It has several major tributaries that also run parallel to the chalk ridges. Its water gap is one of the widest through the ridges, and the river Medway is correspondingly larger than the others (Table I). The river Stour (gap n, Figure 2) follows the pattern of the rivers Mole and Wey, with tributaries flowing parallel to the ridges inside the North Downs before turning north through a water gap.

All these water gaps are uniformitarian mysteries since in their paradigm no significant erosion occurred until substantial uplift (uniformitarian assumptions 1 and 2 in the section on the need for another paradigm). In that case, topography would have created rivers that flowed down-dip, outward from all parts of the anticline. Studies based on the Flood paradigm can explain single sets of wind and water gaps (Oard 2008, 2013), and the challenge (number 2d) for the Weald is to explain river gaps where the flow is in opposing directions. For that we first need to examine the anticline as a three-dimensional object.

The Three-dimensional Nature of the Weald

So far, we have discussed the erosion of the Weald inner basin in a notional, two-dimensional model, with flow in a single direction. More of the process can be understood by expanding our view to all three dimensions. During uplift of the Wealden anticline, three factors would have influenced erosion. There was sheet flow from the north and west, but as the Wealden anticline lifted (and the London Basin sank), the changing submarine topography would have complicated the flow. In addition, the Flood's sea level relative to the continents would have been constantly declining. Eventually, the rising elongated north-south anticline would have diverted flow to the north and south, initially as local sheet flow (Figure 9).

This flow pattern is supported by the present-day southward flow of the rivers Arun, Adur, Ouse, and Cuckmere, which carry a total average of 16.6 m^3/s. The matching rivers in the north (Wey, Mole, and Darent) have a smaller total flow rate (11.6 m^3/s). This is consistent with that earlier southern flow having helped to create a subterranean gradient north to south. When the Floodwaters had retreated, this gradient encouraged development of the present-day rivers.

This off-slope recession of water explains the numerous dry valleys on the back slopes of the Downs (Figure 9). As the sheet flow subsided into channelized

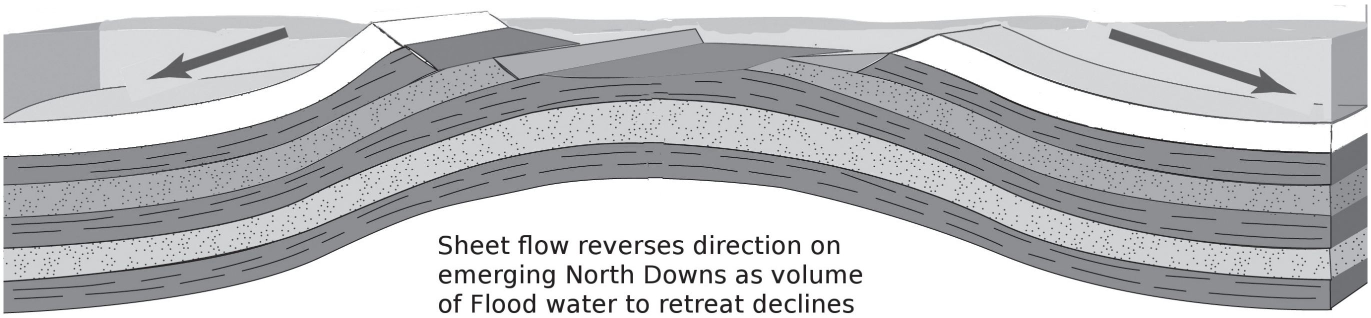

Figure 9. Sheet flow reverses direction on the emerging North Downs and causes a flow reversal (modified from Figure 6).

flow down the anticlinal limbs, these valleys were carved. Because they are not the product of the present-day water cycle, they are dry. Today's rainfall is insufficient to sustain any form of stream flow in these valleys.

The erosional retreat of the Floodwaters was further complicated by the differential uplift. Today we see evidence for it in the slope of the axis down to the east, as well as the north-south slopes of the limbs. Fracturing of the chalk on the surface during uplift would have then included complex patterns oriented both parallel and perpendicular to the axis. This would have created faulting and brecciation along zones of weakness. One obvious outcome is the course of the river Medway as it emerges from the inner basin (gap m, Figure 2). The abrupt change in the angle of the ridge (about 30°) at that water gap points to a complex rotational fault having occurred there during uplift. There would have been a significant region of breccia between the two portions of the ridge (Walsh et al., 1998). This would have been easily removed with the sheet flow, whatever direction it was flowing. Other examples of significant faulting include the river Wey gap (gap j, Figure 2), where there is a change in the angle of dip in the strata of ~45^0 from here west until the wind gap (i, Figure 2).

Deformation was further complicated by several local periclines—combinations of anticlines and synclines—that developed in the inner Weald basin as overburden was removed. These are not addressed in this paper. Several similar geomorphological features are present in northern France. Thus, it is probable that the English Channel did not form until relatively late in the development of the Weald's geomorphology. That too is a topic for another paper, as we must now focus on the formation of the water and wind gaps.

The Formation of the Water and Wind Gaps

Detailed uniformitarian explanations for the erosion of the Weald inner basin in conjunction with the water and wind gaps do not exist except for brief discussions about river capture (Dines and Edmunds, 1929). There is a throwaway remark by Jones (1999a) that the geomorphology and river pattern in the inner basin was originally considered to be "superimposed from a high-level marine erosion surface" (Jones, 1999a). In contrast, Stage 3 of our model provides an explanation outside the uniformitarian framework.

Since we are discussing events occurring over days rather than millions of years, the emergence of the Weald above sea level from a large "Flood lake" would have occurred rapidly over exposed portions of the North and South Downs (Figure 10). Since the English Channel had not yet formed, the "lake" in the center of what was the crest of the anticline would have extended across the present English Channel into northern France.

At this point, this lake was isolated by the chalk Downs, and it continued to rise relative to sea level. Weak points, either from faulting or brecciation, were inevitable, and pressure would have led to its breaching at several locations. Water and wind gaps would have started as relatively structurally high notches on the limbs of the anticline. As the "Flood lake" drained, it eroded the soft rock of what is now the inner Weald basin and deepened the outlets, resulting in the present-day gaps. Changing water level and local topographic features caused by the periclines may have caused flow through some gaps to cease, resulting in wind gaps being left behind as the main drainage continued.

Figure 10 shows their development in symbolic form. Notch G1 was eroded when the water level was higher than in the figure. Minor diversions of flow, less breccia, or resistant rock slowed up the rate of erosion relative to other gaps

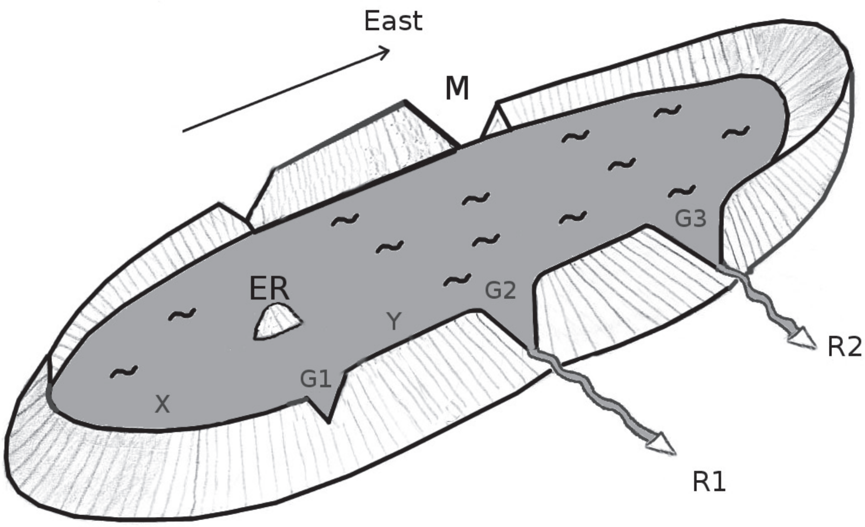

Figure 10. The Flood "lake" that formed after the erosion of the inner Weald basin exposed much of the rim of the North and South Downs. This was the beginning of the formation of water and wind gaps.

such as G2 and G3. With farther fall in the water level, G1 became completely dry while G2 and G3 continued to allow flow out of the basin. The symbols R1 and R2 represent the portions of two of the present-day rivers that flow southward such as Arun and Adur, where they are external to the Weald basin. The large gap M represents the Medway gap, though the river is not shown.

River "Capture" and Differences in Water Gaps

River capture of the Blackwater by the Wey (gaps i and j, Figure 2) was seen by Dines and Edmunds as a case of completing headward erosion. That explanation is questionable (Oard 2008, 2013). The location of the Sussex river Rother leading into the Arun (d on Figure 2) suggests that the river Arun "captured" the Lavant and the Meon. But this topic has not been addressed by uniformitarian literature, other than a brief discussion of the "capture" of parts of the Wey by the Arun (Worssam, 1973). The explanation for the Blackwater-Wey capture is vague, and the two rivers are separated by a short stretch of land a few meters in height, nearly the same as the supposed Arun-Wey capture. In contrast, the river Lavant with its highest point of ~60 m (200 ft), is separated by two wind gaps (e and f in Figure 2) of minimum heights ~100 m (330 ft) and ~150 m (500 ft). Furthermore, the main portions of the Sussex river Rother are at less than ~20 m (65 ft). That firmly rules out subareal capture theories.

We have already noted that the Arun and Adur gaps are similar in profile east to west. Yet the river Arun has a mean flow approximately four times that of the Adur (Figure 7 and Table I). The explanation for that difference is the larger drainage basin of the Arun. But why then are the gaps similar, if these water gaps were formed by some kind of unspecified uniformitarian process? At an early stage in the development of the Weald, the three Lavant and Meon wind gaps represented by the single gap G1 in Figure 10 would have been draining water from the area around X, since that is the nearest exit point, and from around Y. Thus at that stage, the Arun gap (represented by G2) would have been developing with far less portion of the total flow than now emerges at that position, and by inference, have a similar erosional potential to that occurring at the Adur gap (represented by G3) rather than four times.

Eventually, the water level in the "lake" would have fallen below the notch in gap G1 because erosion did not keep pace with the fall in the water level. So G1 becomes a representative of the Meon/Lavant wind gaps. But flow that was emerging from the Weald inner basin from regions between X and Y now had to emerge from other gaps such as G2. The reversal of flow direction of water originally flowing from Y to G1 changed the scouring on the lakebed and left the impression, when the lake was completely dry except for the rivers now sustained only by rainfall, of "river capture." No such "capture" has occurred.

Erosional Remnants in the Inner Weald Basin

There are erosional remnants in the inner Weald basin (Oard and Matthews, 2015). Much of the Weald inner basin is below ~50 m (160 ft). However, there are numerous hills of heights up to 300 m (1,000 ft) away from the chalk ridges; eight of the most significant ones are shown in Figure 2. ER in Figure 10 means "erosional remnant," such as Hindhead (Figure 2) with its series of closely spaced dry valleys. These erosional remnants likely were caused by the complex uplift and erosion of several periclines developing while the "lake" was near its maximum height. Their existence and, in particular, the steep sides with tightly bunched dry valleys (see below), often in a radial pattern, point to a rapid rise through the Floodwater in the "lake."

Dry Valleys in the Chalk

The many dry valleys in the chalk are a major mystery for uniformitarian geology. Wooldridge and Goldring (1953) suggested that they are remnants of past higher water tables. Roman wells, now dry, confirm that the water table was higher in the past, suggesting higher rainfall too. But the amount of rain required to create the dry valleys has been recognized as being exceptionally "speculative." Also, much higher amounts of rainfall contradict uniformitarianism. But within the Flood paradigm, sheet flow turning to channelized flow down the dip-slopes of the emerging chalk is a realistic explanation. As far as the erosional remnants are concerned, a mechanism for the formation of dry valleys on them, which form a 360° pattern, has not been envisaged apart from this proposal of the water level in the "lake" declining rapidly.

Around the inner edges of the cuestas are tightly bunched dry valleys, clearly seen in Figure 5. They are almost like crenulations. Typically they are twice as frequent as the dry valleys on the outward chalk slopes. Parts of the slopes are up to 45°, while the average is around 20°. Such crenulations exist in many parts of the chalk landscape, particularly to the west of the Weald. They all point to huge volumes of water flowing down from the ridges toward the inner Weald and eroding these patterns with water emerging by Darcy flow from the saturated rocks.

Silcrete and Sarson Stones

As indicated in Part I, the origin of duricrusts is also a mystery for uniformitarian science. The origin of silcrete is especially so, because of the problematic origin of the silica. Since the Weald has a partial silcrete layer capping the highest terrain with eroded sarson stones (the silcrete layer is best developed farther west in south-central England), our model of Flood runoff erosion offers some light on this mystery.

The silcrete layer is really hard, silica-cemented sandstone (Catt and Hodgson, 1976). There is a lot of coarse gravel, mainly flints, in the silcrete. So the silcrete is not a pure chemical deposit, like some of the silcretes in Africa and Australia, but silica-cemented sand, with the grains also being predominantly silica. It is the origin of the *sand* that is the key to this mystery, and we hypothesize that it was transported during sheet erosion from the north-northwest. The erosion of the chalk accounts for the flint nodules. The silica cement could have originated from the dissolution of either the sand or the flint nodules. Flint is almost pure silica. On the other hand, it is possible that the Floodwater was highly charged (supersaturated) with silica during transport and deposition of the sand.

A similar model explains that duricrusts in general, whether ferricrete, silcrete, calcrete, or bauxite, depended upon the composition of the Floodwater for a particular deposit. The chemical could have been dissolved from the regional bedrock or transported from a distance. These chemicals flowed through the depositing material, cementing the particles rapidly. The origin of duricrusts is by Flood runoff after the formation of erosion and planation surfaces.

Summary

This creationist study of the geomorphology of the Weald in southeast England has tied the massive erosion and the formation of the landforms to the Genesis Flood in seven key points. Similar processes have been seen in the western United States and elsewhere in the world (Oard, 2008, 2013). Uniformitarianism, or its slightly refined form of actualism, is unable to explain many of these features.

Future Work

The Weald is just a small part of the UK. It would be interesting to try to correlate the events in the Weald with those in the neighboring Thames basin, possibly across into France, and south and west into the Hampshire-Dieppe Basin. The incentive would be to examine the area to the north of the Weald, where gravel terraces on the Thames River have been correlated by uniformitarian geologists with numerous ice ages (Lewin and Gibbard, 2010). But if there was only one ice age (Oard, 2004), then how are the many terraces to be explained? Preliminary examination shows that it is quite possible the lower terraces resulted from the melting of one ice sheet over the British Isles and the higher terraces are from channelized Flood runoff, similar to those in the upper Wind River Basin of northwest Wyoming, USA (Oard, 2014). This could be another significant challenge to uniformitarianism.

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